Modality and the Semantics-Pragmatics Interface

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Thesis submitted in partial fulfilment
of the requirements for the degree of Ph.D.

University College London
1998

To my family
with love and gratitude

Abstract

This thesis explores certain aspects of the structure of lexical semantics and its interaction with pragmatic processes of utterance comprehension, using as a case-study a sample of the English modal verbs. Contrary to previous polysemy-based accounts, I propose and defend a unitary semantic account of the English modals, and I give a relevance-theoretic explanation of the construction of their admissible (mainly, root and epistemic) contextual interpretations. Departing from previous accounts of modality, I propose a link between epistemic modality and metarepresentation, and treat the emergence of epistemic modal markers as a result of the development of the human theory of mind.

In support of my central contention that the English modals are semantically univocal, I reanalyse a range of arguments employed by previous polysemy-based approaches. These arguments involve the distributional properties of the modals, their relationship to truth-conditional content, the status of so-called speech-act modality, and the historical development of epistemic meanings: it turns out that none of these domains can offer reasons to abandon the univocal semantic analysis of the English modals. Furthermore, I argue that the priority of root over epistemic meanings in language acquisition is predicted by the link between epistemic modality and metarepresentation. Finally, data from a cognitive disorder (autism) are considered in the light of the metarepresentation hypothesis about epistemic modality.

The discussion of modality has a number of implications for the concept of polysemy. I suggest that, despite its widespread use in current lexical semantics, polysemy is not a natural class, and use the example of the Cognitive Linguistics to illustrate that polysemy presupposes some questionable assumptions about the structure of lexical concepts. I propose a division of labour between ambiguity,

semantic underdeterminacy, and a narrowed version of polysemy, and present its ramifications for the psychology of word meaning. In the final chapter, I extend the proposed framework for modality to the analysis of generic sentences, thereby capturing certain similarities between genericity and modality.

Contents

Acknowledgements

I want to thank a number of people for their support, both academic and personal, in the years of writing this thesis. Deirdre Wilson, my main supervisor, has been a constant source of intellectual stimulation, moral support and emotional generosity. She has seen numerous versions of the thesis, and her detailed and sharp comments were the main reason new versions were better than previous ones. Our long discussions have had an obvious influence in my thinking about communication and cognition; her humour and spirit have made these discussions even more fun.

Neil Smith, my second supervisor, has read multiple drafts of every chapter, and has unfailingly come up with insightful comments and provocative questions; the breadth of his knowledge and the wit with which he delivers it made his encouragement all the more heartening.

Robyn Carston has discussed with me various aspects of this work, and has provided me with penetrating comments, thoughtful guidance and steady support. Villy Rouchota has offered me illuminating opinions and invaluable help on a number of occasions. Dick Hudson and Giannis Veloudis have read and discussed with me parts of this work, and their observations and clear thinking are gratefully appreciated. I have also profited from comments from and discussions with the following people: Paul Horwich, Rita Manzini, Vlad Zegarac, Adrian Pilkington, Steve Nicolle, David Adger, Francesca Happé, Marjolein Groefsema, Manuel Leonetti, Annabel Cormack; I am indebted to them all.

I was fortunate to be a member of the Pragmatics Reading Group in the Department of Linguistics at UCL, where much of the material in this thesis was presented. I want to thank my fellow research students Richard Breheny, Corinne Iten,

Milena Nuti and George Powell for many enjoyable discussions on Wednesday afternoons.

During the past five years I received enthusiastic encouragement and moral support from my university teachers in Athens; the contact with them helped me find my way through many difficult moments. I wish to thank especially Georgios Babiniotis, Dimitra Theofanopoulou-Kontou, Keti Bakakou-Orfanou, Dimitra Chila-Markopoulou, Christoforos Charalambakis, Amalia Mozer and Kiki Nikiforidou. Irini Warburton-Filippaki at Reading has been a source of much-appreciated guidance and encouragement.

My research was financially supported by successive grants from the State Scholarships Foundation in Greece and the A. G. Leventis Foundation; I thank them both. I am also indebted to the Newby Trust and the Gilchrist Educational Trust for funding more specific parts of this project.

Writing a thesis can be a very solitary experience. Several friends have made sure I remember that life is a lot noisier, messier and more intoxicating place than my desk. I thank Irini Veliou, Kostas Mantzos, Vassilis and Tasos Paschalis, Angelos Kokolakis, Valia Kordoni, Dawn Walter, Giorgos Roussos and Theano Moussouri for many memorable London days. Special thanks to Villy Rouchota and Hans van de Koot for their warmth and understanding, and to Ad Neeleman and Corinne Iten for keeping my spirits up in the last stages. Finally, I thank my parents, Dimitris and Eleni Papafragou, and my sister Efie, for their love, patience and trust. Their affection and optimism have sustained me all this time and, although being far away, they were never so close.

Chapter One

Introduction

1.1 LEXICAL MEANING AND CONTEXT-DEPENDENCE

A well-known property of lexical items in natural language is that they are capable of conveying different meanings in different situations of utterance. Examples of the context-dependence of lexically expressed meanings include the following:

(1) a. The lawyers approached the *bar* to have a word with the judge.
b. The lawyers approached the *bar* and ordered two martinis.

(2) a. I asked her many times but got no *answer.*
b. I rang her many times but there was no *answer.*

(3) a. I want to fly like a *bird.*
b. A *bird* was flying above the corpses.

On a traditional analysis, examples (1)-(3) correspond to distinct semantic options (see Cruse 1986, Lyons 1977, Saeed 1997). In (1), *bar* is lexically ambiguous between (roughly) the senses 'court area' and 'area serving drinks': it therefore corresponds to two distinct (and unrelated) entries in the mental lexicon.[1] In (2), *answer* is polysemous: it encodes two separate but related meanings, and is thus treated as a case distinct from (1). In (3), *bird* is semantically univocal but its contextual interpretation takes on different properties depending on pragmatic considerations. (3a) involves the construal of a member of the category BIRD which is very close to the prototype:

[1] Notational conventions: Concepts are cited in capital letters. The use of small-case italics is generally reserved for lexical items. I will occasionally use single quotation marks to refer to an expression's meaning.

something like a swallow; (3b), by contrast, involves an exemplar which is closer to a vulture. One of the main problems for linguistic theory has been to account for the various aspects of the context-dependence of lexically communicated meaning - which includes (but is not limited to) the phenomena in (1)-(3) - in a principled way.

Of the three possibilities above, polysemy has always been the hardest to delineate, and its territory the most difficult to separate from either ambiguity or semantic univocality (monosemy). Interestingly, the concept has been revived and developed in much recent research within philosophy, cognitive psychology, linguistics and artificial intelligence, where there has been a resurgence of interest in the structure of the mental lexicon and the way it interacts with other components of cognitive architecture (see selectively Kleiber 1984, 1995, Jackendoff 1983, 1987, 1990, Pustejovsky 1995, the collections in Tsohatzidis 1990, Lehrer and Kittay 1992, Pustejovsky 1993, Pustejovsky and Boguraev 1996; cf. also next section). Although there is still little consensus among different researchers as to how the subvarieties of systematic multiplicity of lexical meaning are to be captured, a lot of authors converge on the conclusion that our lexical entries have a rich internal structure, which often over-determines the output of the comprehension process (in the sense that it furnishes more than one candidate sense , between which pragmatic interpretation has to choose). This structure is polysemic,[2] in that it consists of clusters of related concepts which correspond to different contextual readings of a lexical item. Details differ among accounts, and polysemy is often used as a portmanteau term to cover a variety of cases - with corresponding implications for the division of labour between this option and either ambiguity or monosemy.[3]

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[2] I will use the adjectives *polysemous* for words/lexical items, and *polysemic* for the clusters of interrelated meanings themselves (cf. also *monosemous* vs. *monosemic*).

[3] For instance, polysemy has been invoked to describe and explain: the selection of different complements by aspectual verbs such as (i); the effects of the direct object on the meaning conveyed by the verb in (ii); the effects of the modified noun on the adjectival modifier in (iii); 'semi-conventionalised' uses such as (iv); predictable 'sense extensions' such as (v):

(i) I *began* the novel/reading the novel/to read the novel.
(ii) They *opened* the car/the bottle/the envelope.
(iii) My boss has a *healthy* face/diet/dog.
(iv) Artistic creation is a *miracle*.
(v) *The third violin* is playing badly.

On *begin* and *healthy*, see Pustejovsky (1993, 1995), Pustejovsky and Boguraev (1993), Pustejovsky and Bouillon (1996); on *open*, see Taylor (1995); on 'semi-conventionalised' uses and 'rule-governed sense extensions', see Apresjan (1973), Ostler and Atkins (1992), Copestake and Briscoe (1996), Fauconnier (1985, 1997). I return to examples of this type in section 1.4.1 below; see also 5.2.

This thesis explores aspects of the context-dependence of lexical meaning, especially in connection with the types illustrated in (1)-(3). Given the flexibility of lexical concepts, one would want to know what it is about their semantic representation that allows them to receive multiple interpretations in context - or, to put it differently, what sorts of starting points are provided by grammatical information and how they are exploited by the pragmatic mechanisms of utterance comprehension. One of my aims in the chapters to follow is to explore possibilities for the description and explanation of the plasticity of lexically expressed information. A parallel aim is to investigate some diagnostics for the division of labour between various alternatives regarding the mental representation of word meaning; in doing that, I will give special consideration to the concept of polysemy as it has been employed in recent linguistic theory. My contention will be that this concept is not homogeneous enough to qualify as a distinct type of the multiplicity of lexical meaning; moreover, its use within linguistic theory often presupposes some questionable assumptions about the structure of human concepts. The ultimate objective of this study is to separate the contribution made by linguistically encoded information and inferential processes in the derivation of contextually attested interpretations of lexical items. These two sources of linguistically communicated information essentially correspond to the semantics-pragmatics distinction, at least according to one way of drawing it (see section 1.4.1).

In the next section, I present an approach to polysemy which will be the focus of my discussion in the chapters to follow. Many of my arguments for drawing the boundaries between different lexical semantic options in the main body of this thesis will develop indirectly in arguing against this theory of polysemy. In section 1.3, I introduce a specific empirical domain, that of English modal verbs, which I will use as a case study to assess claims about the role of polysemy in lexical structure and competing analyses of the organisation of the lexicon in general: I briefly present the issues raised by the lexical semantics of modal expressions and justify my choice of modality as a testbed for theories of lexical semantic organisation. In later sections, I return to the ambiguity and monosemy positions, and motivate several sub-varieties of semantic indeterminacy within a relevance-theoretic framework.

1.2 THE CONCEPT OF POLYSEMY IN LINGUISTIC SEMANTICS

In what follows, I will concentrate on the approach to polysemy adopted within Cognitive Linguistics. There are a number of reasons for this choice. As a theory of lexical and conceptual structure, Cognitive Linguistics has recently inspired a diverse research programme and has been influential in various strands of cognitive science. There is a considerable body of empirical work which has applied the tenets of the theory to specific linguistic phenomena. Furthermore, this framework is often used as the conceptual backdrop to many detailed attempts to deal with polysemy within different models (see, e.g., Copestake and Briscoe 1996). Finally, many of the basic theoretical stances (and, consequently, any objections to them) apply to other frameworks which accept polysemy as a fundamental of linguistic and conceptual organisation.[4]

Just as some of the theoretical assumptions I will present are espoused by researchers who are not themselves committed to the Cognitive Linguistics agenda, not everything in the framework I will sketch is taken up by all researchers within Cognitive Linguistics: there is far less theoretical homogeneity within this programme than my discussion recognises. For reasons of space, I will have to concentrate on some versions of the theory rather than others, although I hope to maintain a level of generality which is shared by various researchers in the field.

1.2.1 Background

The Cognitive Linguistics approach to word meaning is based on two fundamental theses - what I will call the Cognitive Penetrability and Conceptual Embodiment theses.[5] According to Cognitive Penetrability, linguistic competence is not autonomous from the type of human knowledge which may broadly be termed encyclopedic; as a result, no distinction is drawn between the semantic content of a linguistic item (or

[4] See the growing grammaticalisation literature; e.g. Traugott and Heine (1991), Heine, Claudi and Hünnemeyer (1991), Hopper and Traugott (1993), Bybee, Perkins and Pagliuca (1994), Bybee and Fleischman (1995b). Cf. Jackendoff (1992: 31) for a comparison between his Conceptual Semantics and Cognitive Linguistics.

[5] 'Conceptual embodiment' is a term of Lakoff's (1987a: 12). I concentrate here on his presentation of the theoretical tenets of Cognitive Linguistics.

construction) and the bits of world knowledge associated with it (Haiman 1980, Lakoff 1987a, Johnson 1987, Sweetser 1990, Langacker 1987, 1991). According to Conceptual Embodiment, the properties of certain concepts are a consequence of the nature of human biological capacities and the experience of functioning in a certain physical or social environment. This idea is meant to contradict the view that concepts exist independently of the bodily nature of any thinking beings and independently of their experience (Lakoff 1987a: 12, Johnson 1987).

The Cognitive Penetrability and Conceptual Embodiment tenets jointly entail the following methodological strategy in Cognitive Linguistics: in order to describe and explain what it is to grasp the meaning of a linguistic item, one has to construct a complex web of relations and properties within which this particular meaning will be firmly placed. An idea of what is involved in specifying the meanings of words (and complex expressions) is given by Lakoff's Idealised Cognitive Models (ICMs - see Lakoff 1987a: 282ff.). According to Lakoff, ICMs are the products of human conceptualising capacities and correspond to the main conceptual structures available to humans for making sense of their experience. What is more, they offer the background against which any given word is defined. To take just one example: to understand what *waiter* means, one has to grasp the whole ICM representing a restaurant. According to Lakoff (1987a: 286), such an ICM consists typically of a 'scenario', i.e. an initial state, a sequence of events, and a final state, which jointly represent what usually happens when one goes to a restaurant. It is only against this wider ICM that the meaning of the word *waiter* can be understood. Other cases of concepts defined on the basis of ICMs of the 'scenario' subtype are BUYER, which is characterised relative to a commercial exchange scenario, and SECOND BASEMAN, which is characterised relative to a baseball game scenario.

In a sense, then, ICMs can be grouped alongside other types of information-bearing mental structures which have made a career in cognitive psychology, such as scripts (Schank and Abelson 1977), frames (Fillmore 1985, Fillmore and Atkins 1992), or mental models (Johnson-Laird 1983). A crucial assumption about ICMs which, as far as I know, sets the above proposal apart from its competitors in the literature involves the way ICMs are constructed. In Lakoff's view, ICMs are formed from basic-level and image-schematic concepts. Both of these types of concepts are the output of

the lowest-level cognitive processing and, as such, form the building blocks of cognition. Basic-level concepts are those members of the hierarchies of conceptual categories which appear to have a privileged status with respect to a variety of tasks such as object naming and recall, category recognition, and language acquisition, as well as properties such as simple linguistic expression, or cultural significance. An example of a basic-level concept is FLOWER in the hierarchy PLANT - FLOWER - TULIP. As for image-schematic concepts, these are defined as abstract non-propositional conceptual structures which are used to shape perception and cognition. Candidates for image-schematic concepts are CONTAINER, SOURCE-PATH-GOAL, LINK, PART-WHOLE, CENTRE-PERIPHERY, UP-DOWN, FRONT-BACK, etc. All of these concepts structure our experience of space, and contribute to the construction of ICMs through various combinations and transformations.[6]

These constraints on the formation of ICMs are in accordance with the Conceptual Embodiment thesis; both basic-level and image-schematic concepts are thought to arise from immediate physical experience as a result of the most basic human conceptualising capacities. Conceptual Embodiment places a second constraint on the construction of ICMs: those ICMs which correspond to abstract conceptual domains cannot be formed straightforwardly from the building materials I have mentioned so far. The claim is, then, that abstract concepts are formed on the basis of a metaphoric projection from concrete and experience-based ICMs. This metaphoric mapping among categories retains the basic image-schematic properties of the source ICM. For instance, in order to understand what *love* means, one would have to construct an ICM using the image-schematic structure of an already available, experience-based ICM, which can be more directly understood; for example, the ICM for JOURNEY can yield the metaphorical projection LOVE IS A JOURNEY, which will give structure to the target concept (Lakoff and Johnson 1980, Lakoff 1990). As a consequence, lovers will be taken to correspond to travellers, the relationship will correspond to the vehicle, their common goals to their common destinations on the journey, difficulties in their relationship to impediments to travel, etc. The existence of

[6] Apart from the construction of ICMs, Lakoff (1987a) raises the possibility of using basic-level concepts together with the structuring devices of image-schemas to construct full-blown taxonomies containing superordinate and subordinate categories. This point is not relevant to my discussion and I will not consider it in what follows.

such a mapping is manifested in linguistic expressions such as those in (4) (Lakoff 1990: 206):

(4) a. Our relationship has hit a dead-end street.
b. Look how far we've come.
c. We may have to go our separate ways.
d. Our relationship is off the track.

There are various types of Idealised Cognitive Models in Lakoff's (1987a) system, and each of them is responsible for generating a series of prototype effects. Since my main concern is not with prototypicality, I will have nothing to say about this aspect of Lakoff's analysis at this point. Instead I will turn to the treatment of polysemy.

1.2.2 Polysemy

As I have already noted, natural-language items are often capable of communicating more than one meaning depending on the linguistic environment and the situation of utterance they occur in. It is standardly observed that these meanings are often somehow related to each other, unlike in classic lexical ambiguities such as *bank, bar,* etc. Lakoff (1987a: 416) mentions Fillmore's example of the adjective *long*, which can have both a temporal and a spatial interpretation, the latter being more central or prototypical. Another example is the preposition *up* in its two uses in *I'm feeling up today* and *The rocket went up*; again, Lakoff takes the spatial meaning to be the more central of the two meanings.

Cognitive Linguistics rejects the idea of a common abstract meaning underlying all the uses of the above lexical items for three reasons (see Lakoff 1987a, Gibbs 1994, Taylor 1995, Langacker 1987, 1991). First, it is argued that a unitary-meaning approach would yield very counterintuitive core meanings for most words, in the unlikely case that such abstract meanings could be formulated at all. Second, the various meanings a given item may convey are sometimes characterised by family resemblance, rather than by the fact that they all share an underlying semantic component (cf. the familiar Wittgensteinian example of *game*). Finally, the core-

meaning approach would be incapable of accounting for the typicality ratings associated with the individual senses.

It is claimed that a more satisfying way of dealing with this multiplicity of interconnected meanings (polysemy) is to view lexical items as constituting natural categories of senses, i.e. complex clusters of related concepts encoded by a single lexical item: thus, 'some senses of a word may be more representative than other senses' (Lakoff 1987a: 417). The senses of a polysemous word may be related by various means, the most basic probably being conceptual metaphor.[7] The senses of *up*, for instance, are linked through a metaphorical mapping from the spatial ICM to the emotion ICM; it is the source ICM which structures the sense which is considered to be prototypical.

To take another example from Johnson (1987): a common source of systematic polysemy comes from the use of the CONTAINER image-schema. This schema consists of a boundary distinguishing an interior from an exterior, thereby allegedly defining the basic distinction between the concepts IN and OUT. The immediate grasp of this schema comes from kinaesthetic bodily experience, since we experience our own bodies as containers; this image-schema is subsequently employed in metaphoric projections of the kinaesthetic into other (occasionally non-concrete) domains of experience, so that events, states and abstract entities are interpreted as spatially bounded entities. The result, says Johnson, is manifested in the systematic polysemy of various spatial prepositions, as the following examples demonstrate (ibid. p.34ff.; cf. also Lindner 1981, Brugman 1988):

(5) Tell me your story again, but leave out the minor details. (STORY EVENT AS CONTAINER)

(6) I give up, I'm getting out of the race. (RACE EVENT AS CONTAINER)

(7) Whenever I'm in trouble, she always bails me out. (STATE AS A CONTAINER)

(8) Don't you dare back out of our agreement. (AGREEMENT AS CONTAINER)

[7] Other types of polysemy involve mappings within a single ICM: *window* may refer to an opening, a glass-filled frame, or the glass itself.

Likewise, it is argued that abstract reasoning is understood in terms of the CONTAINER schema: for instance, class inclusion and other set-theoretic relations are assumed to be conceptualised in terms of manipulation of the CONTAINER schema.

The synchronic arguments supporting a polysemy-based account of (much of) lexical meaning are normally seen as part of a triplet, also including diachronic and developmental claims (Sweetser 1990). More specifically, it is argued that those senses which are synchronically considered to be more basic/typical are often also the ones which appear first in both the ontogenetic and the phylogenetic development of language. To mention just a couple of standard examples: It seems a robust cross-linguistic fact that temporal expressions grew out of spatial ones (cf. the English *be going to*, the French *venir de*, etc.; Fleischman 1982, Bybee, Perkins and Pagliuca 1994, Traugott 1989); this seems to parallel the synchronic polysemy of items such as the adjective *long*, mentioned above, in which the spatial sense is felt to be somehow more 'basic' than the temporal sense. More generally, the unidirectionality of semantic change from more concrete to more abstract meanings has been claimed within Cognitive Linguistics to offer some cognitive motivation to historical variation, thereby facilitating a unified view of both synchronic processes in the lexicon (e.g. metaphorical mappings) and successive stages of lexical competence.

One of my objectives in the chapters to follow is to reconsider some of the assumptions about polysemy made within the Cognitive Linguistics framework. I do not want to deny that there are cluster concepts, or categories structured around family resemblance; rather, the disagreement lies in the extent to which lexical flexibility can be explained in terms of polysemy-based entries. I maintain that some of the criteria invoked in the literature do not point unequivocally to polysemy, and that alternative, monosemy-based accounts coupled with a powerful pragmatic-inferential device may be preferable on both empirical and theoretical grounds.

1.3 MODALITY: A TEST CASE

It is widely acknowledged in the linguistic literature that modal expressions may be used to communicate at least two broad clusters of meanings: *epistemic* modal meanings, which roughly deal with the degree of speaker commitment to the truth of the proposition that

forms the complement of the modal, and *deontic* modal meanings, concerned with the necessity or possibility of acts performed by morally responsible agents, e.g. obligation and permission (Lyons 1977, Kratzer 1981a, Coates 1983, Palmer 1986, 1990, Sweetser 1990, Bybee and Fleischman 1995b). The utterances in (9)-(11) and (12)-(14) (on their preferred interpretations) are examples of epistemic and deontic modality respectively:

(9) You must be John's wife.
(10) That may be the postman. (on hearing the doorbell)
(11) If you are interested in studying the mind, lectures in Linguistics should prove interesting.

(12) You must feed the animals twice a day.
(13) You may leave the room only after having signed these papers.
(14) Full credit should be given to the city authorities for having done so much for the environment.

Apart from the epistemic/deontic distinction, a third main area of modal meaning is often recognised: so-called *dynamic* modality, which includes the notional categories of real-world ability, possibility and intention/willingness (von Wright 1951, Palmer 1990):

(15) My son can speak four languages.
(16) I will become the best skier in the world.

Normally, deontic and dynamic uses are grouped together under *agent-oriented* modalities (to be distinguished from *speaker-oriented*, i.e. epistemic, modalities - cf. Bybee and Pagliuca 1985, Bybee, Perkins and Pagliuca 1994, Bybee and Fleischman 1995a), or *root* modalities (Bybee 1988a, Sweetser 1988, 1990, Traugott 1989). In this thesis, I will adopt the root-epistemic distinction throughout, and I will refer to dynamic modal readings as *simple root* interpretations.

An interesting fact about the root and epistemic types of meaning is that they often tend to be expressed by a single class of modal expression in the languages of the world (for cross-linguistic evidence, see Fleischman 1982, Perkins 1983, Traugott

1988, Traugott and König 1991, Bybee, Perkins and Pagliuca 1994). English modal verbs are probably the set of items for which this claim has been most extensively illustrated (for an overview, see Palmer 1990): this thesis will focus on a representative sample of them (mainly *must, may, can, should,* and secondarily *ought to* and *could*). The modals constitute a good area for testing claims about the semantics-pragmatics interface: the root-epistemic alternation has long been at the centre of debates on how best to capture the contextual variability of lexical meaning, while ambiguity, polysemy and unitary semantic analyses have been proposed and defended for modality in English (and other languages).

More generally, modality has always been an important area within linguistics, philosophy and psychology. In linguistics, modality epitomises a number of concurrent developments from language acquisition to language change. Furthermore, modal concepts are a cornerstone of human cognition and reasoning, so that theories of their lexicalisation and use in natural language span a spectrum of different psychological and philosophical perspectives on the fundamental relation between language and thought.

Modality being such a well-documented area, there is a wealth of empirical material which requires explanation. However, modal data contain a notorious amount of idiosyncratic detail, which often makes the possibility of comprehensive analyses seem formidably elusive. In the chapters to follow, I do not begin to do justice to the complexity of the facts about modality, nor do I set out to offer a full account of the situation in English. My aim is to describe and explain main tendencies in the area, to give a conceptual map of modality, within which individual items and cross-linguistic data may (to a degree, predictably) differ.

1.4 THEORETICAL COMMITMENTS: RELEVANCE THEORY

In developing a semantic and pragmatic account of modality, I adopt the relevance-theoretic approach to utterance comprehension. In what follows, I give a brief

summary of basic relevance-theoretic tenets; for fuller accounts, I refer the reader to Sperber and Wilson (1986/1995, 1987), Blakemore (1992).[8]

1.4.1 Semantics, pragmatics, and underdeterminacy

According to relevance theory (Sperber and Wilson 1986/1995, Wilson and Sperber 1988b, Carston 1988, 1998, Blakemore 1987, 1992),[9] (linguistic) semantics corresponds (broadly speaking) to knowledge of meaning which is provided by the grammar; more particularly, lexical semantics characterises the linguistically encoded content of lexical items. This view of linguistic semantics is resolutely cognitive: it presupposes a Representational Theory of Mind (basically of the Fodorean type; see Fodor 1975, 1983, 1990), which is based on the following premises: (a) the human cognitive system perceives and processes information from the environment through the construction of propositional representations in the language of thought; (b) language is an input system, a specialised module in the architecture of the mind, which is geared towards the translation of natural-language strings into conceptual representations. Grammar, according to this picture, is a mapping between natural-language forms and conceptual representations which constitute the logical form of an utterance. Logical form is thus the output of a specialised and autonomous module and can be plausibly seen as a formula in a mental language.

On the level of individual lexical items, the linguistic mapping onto logical form essentially corresponds to the 'opening up' of the conceptual addresses of individual constituents of an utterance. According to Sperber and Wilson (1986/1995: 86ff.), the decoding of single lexical items typically gives access to a conceptual address, which provides further access to a tripartite informational structure.[10] This structure consists

[8] Carston's (1988) brief summary of relevance theory has been particularly helpful to me in preparing this section.

[9] Kempson (1988) gives a very illuminating exposition of the issues I discuss in the following paragraphs. Cf. also Kempson (1996).

[10] I concentrate here on those kinds of linguistic decoding process which contribute a concept to the logical form of the utterance, since my thesis focuses exclusively on conceptual semantics. Relevance theory recognises a second type of linguistically encoded content which contributes a procedure, rather than a concept, to the interpretation process: procedural semantics thus constrains some aspect of the inferential search for the intended interpretation of an utterance. On procedural semantics, see Blakemore (1987, 1988), Wilson and Sperber (1993a), Rouchota (1994a, 1994b, 1998/forth.), Breheny (in prep.).

of the following kinds of sub-entries: (i) a logical entry, which includes a set of deductive rules that apply to the logical forms of which the concept is a constituent; (ii) an encyclopedic entry, which contains information about the objects (events, properties) which instantiate the concept; (iii) a lexical entry, which contains information about the natural-language item which encodes the concept. Logical entries can be represented in terms of Fodor's meaning postulates, i.e. elimination rules. (17) gives the elimination rule for the concept GIRAFFE and (18) the elimination rule for the concept YELLOW (examples from Sperber and Wilson 1986/1995: 92):

(17) Input: (X - GIRAFFE - Y)
Output: (X - ANIMAL OF A CERTAIN SPECIES - Y)

(18) Input: (X - YELLOW - Y)
Output: (X - COLOUR OF A CERTAIN HUE - Y)

Encyclopedic entries capture most of our knowledge about categories. For instance, our encyclopedic entry for LONDON contains information about the city's geographical location, history, population, and present character; this information is organised in terms of frames, schemas, or scripts, and may contain the representation of prototypes, i.e. typical exemplars of a category (e.g. long-necked animals with brown patches which live in Africa for the category GIRAFFE above - for details see Barsalou 1992).[11] Lexical (or linguistic) entries contain information about the syntactic, phonological and other properties of the natural language expression which encodes the concept. Occasionally, some of these sub-entries may be empty or lacking in particular concepts: for instance, the concept encoded by *and* has no extension and hence no encyclopedic entry.

On this model, then, the output of the grammar-driven process of decoding a linguistic string (i.e. the logical form of the utterance) will be a configuration of conceptual addresses. A crucial claim made within relevance theory is that this logical form grossly underdetermines what the speaker has said. In order to arrive at the

[11] Compared with the relevance-theoretic account of conceptual structure, Lakoff's ICMs can be viewed *prima facie* as a way of structuring encyclopedic entries for concepts. However, they would also have to include logical properties of concepts, since the logical vs. encyclopedic distinction is not accepted in this connection within Cognitive Linguistics.

proposition expressed by the speaker's utterance, the hearer has to perform a series of operations which lie beyond his semantic, or indeed linguistic, competence.[12] Evidence for this underdeterminacy position is supplied by the following example:

(19) Mary said she will leave this place in the evening.

(19) illustrates a host of phenomena which involve the intrusion of non-linguistic parameters into utterance interpretation. The logical form of the utterance underdetermines the full proposition which the speaker intended to communicate in a number of distinct ways. To sample a few: the hearer has to assign reference to the proper name *Mary*; he has to interpret the indexical expression *this place* in a way which will crucially draw on the current situation of utterance; he has to decide on the temporal co-ordinates of *in the evening*; finally, he has to choose between two scope possibilities for the prepositional phrase *in the evening*, which result in different interpretations of (19). Reference assignment, indexicality, spatiotemporal coordinates and scope resolution belong to the most widely recognised cases of semantic underdeterminacy: they clearly show that the logical form of the utterance is typically schematic in many respects - what Sperber and Wilson (1986/1995) call an *assumption schema*, which will serve as a starting point for the construction of what was said by the speaker.

The development of the underdetermined logical form of the utterance into the proposition which the speaker intended to express is effected via a process of pragmatic inference. Pragmatics thus starts where linguistics leaves off, and that can be quite early in the verbal comprehension process. In order to flesh out the incomplete logical form of the utterance, the hearer unavoidably needs to compute the speaker's intention in producing the utterance, and this in turn imposes specific constraints on the steps and the outcome of verbal understanding (I will examine these constraints in some detail in the next section). Generally, the hearer takes the logical form as a basis for constructing a hypothesised representation of the proposition which the speaker intended to express (:the propositional form of the utterance); he then proceeds to the confirmation/rejection of his interpretive hypothesis. The whole process is a case of

[12] In what follows, I will generally refer to the speaker as female and the hearer as male.

non-demonstrative inference: i.e. there is no fail-safe algorithm for the computation of the propositional form of the utterance out of the initial assumption schema which linguistic knowledge delivers.

The endpoint of the inferential development of the logical form of the utterance is a complete logico-conceptual representation: it is this form which will receive a truth-theoretic interpretation, i.e. it will be put into correspondence with states of affairs in the world (or possible worlds). The placement of the elements of a mentally represented formula in correspondence with an 'external' reality lies at the core of most truth-theoretic approaches to semantics: on the picture I have sketched here, it may be seen as a distinct enterprise (which can be called 'the semantics of mental representations') which inevitably complements the translational workings of the grammar.

From the point of view of a cognitive account of utterance comprehension, then, the distinction between semantics and pragmatics essentially coincides with the distinction between linguistic decoding and inference. On the relevance-theoretic view, pragmatics uses as a basis the information provided by the grammar to arrive at the endpoint of the interpretation process (retrieving in the process a variety of communicated assumptions other than 'what the speaker said', e.g. intended implications; see 1.4.2). This way of drawing the semantics-pragmatics distinction is by no means uncontroversial (see Grice 1975, 1989, Bach 1994a, 1994b, Gazdar 1979, Levinson 1983; for a review, see Carston 1998). What does seem clear, however, is the extent to which grammatically delivered information needs to be supplemented by non-linguistic input in order to arrive at the truth-evaluable propositional form of the utterance which the speaker intended to communicate.[13]

The fact that natural language utterances vastly underdetermine the thoughts they are used to communicate (even on the basic level of 'what was said') is not accidental or trivial; indeed, it is quite plausible in evolutionary terms that, given a powerful inferential system, reasons of cognitive economy would motivate the use of information encoded by natural language expressions as a starting point for the

[13] Some version or other of the semantic underdeterminacy thesis is widely accepted in the literature: see Fauconnier (1985), Travis (1981, 1985), Recanati (1989, 1993), Searle (1983, 1992), Atlas (1989), Pinkal (1995), Partee (1995b). Carston (1998) contains a wealth of references and detailed discussion from a relevance-theoretic point of view.

retrieval of the concept/conceptual representation the speaker had in mind. In non-linguistic intentional communication this capacity is exploited quite regularly: a persistent stare or rolling one's eyes may convey very different assumptions in different situations.

The claim that what is communicated goes well beyond what is linguistically encoded sets a research agenda for particular cases. Given the idiosyncrasy of lexical information and the diverse evolutionary origins of our concepts, there is every reason to suppose that our lexical concepts are far from uniform; accordingly, the procedures whereby the information made accessible by a single conceptual address may be moulded into a certain shape in on-line communication may be far from uniform too.

With this background, we may separate different varieties of the flexibility of linguistically expressed (lexical) concepts. Consider the utterances:

(20) They *cut* the cake/the lawn/the paper/the bread.

(21) My friend has a *fast* car/typist/mind.

(22) This steak is *raw*.

(23) Juliet is *the sun*.

(20) offers an instance of a univocal term which can have different interpretations depending on its direct object; *cut* may be seen as semantically indeterminate: it exhibits a degree of vagueness/sense generality and may require contextual enrichment (or narrowing down) in order to convey a more specific concept. This type of pragmatic interference with the concept encoded by *cut* may be called *free enrichment*, since it is not transparently triggered by linguistic factors.

(21) illustrates a second kind of semantic indeterminacy, which may be more accurately described as *semantic incompleteness*: expressions such as *fast* include in their semantic representation a sort of gap or slot, which needs to be filled in contextually. Scalar adjectives such as *fast, rich*, indexicals (*we, here, now*), demonstratives (*that, this*) or items such as *local, recent*, etc., require *saturation*[14] (rather than free enrichment) of their informationally incomplete semantic entry: in

[14] For the term 'saturation', see Recanati (1993).

(21), depending on the type of modified object, the scale of fastness is correspondingly adjusted.

(22) does not involve semantic indeterminacy of any sort, since the semantically encoded content of *raw* is narrow and definable (*raw* means 'not cooked'). The context-dependence of the example comes from the different ways of pragmatically broadening (or *loosening*) the encoded content of *raw* so as to convey a rough approximation (cf. also *silent room, square jaw, straight hair*). According to relevance theory (Sperber and Wilson 1985/6, 1986/1995, Carston 1996), when a concept is used loosely, (part of) its logical entry is dropped, whereas the concept retains some of its most salient encyclopedic properties: a silent room is not perfectly soundproof but still allows concentration, isolation, etc.

Finally, (23) is a more creative case of concept loosening: the metaphorical use of *sun* is at the end of a continuum which includes ordinary cases of broadening the encoded content of a concept so as to cover instances not previously present in the denotation of the concept. This example, then, essentially works like the previous one; the difference lies in the richness of recovered, weakly communicated implications of (23), which account for the perceived 'creativity' of the expression.[15]

The possibilities presented above are compatible with what I will call the 'monosemy thesis'. On this thesis, the contextual proliferation of interpretations of lexical items does not give direct insight into their meaning: many words encode unitary concepts (i.e. they open up singular conceptual addresses in memory) but may convey a rather different concept after being pragmatically manipulated. Although some of these 'ad hoc' concepts,[16] i.e. contextual instantiations of the original conceptual entry, may become stabilised in memory, they do not have to be; indeed, standard methodological considerations of cognitive parsimony might militate in favour of keeping stored conceptual representations as unified as possible. On the monosemy story, the mapping between concepts and natural-language words is far from simple,

[15] In weak communication the speaker assumes only partial responsibility for the cognitive effects which the hearer recovers from the utterance, although she may encourage several lines of interpretation: in different terms, weak communication arises when the communicator's intention to marginally increase the hearer's awareness of a wide range of assumptions itself becomes only weakly manifest (see Sperber and Wilson 1986/1996: 59-60, 1990, and next section).

[16] The term belongs to Barsalou (1983, 1987) and has been widely adopted within relevance theory; cf. Carston (1996), Sperber and Wilson (1997), Papafragou (1995).

since almost every word communicates a concept which departs - to a greater or lesser degree - from the concept which is encoded by that word.

The bias towards pragmatic explanations of the plasticity of lexical content does not, of course, settle the issue of adjudicating between the possibilities represented in (20)-(23) (or other candidate analyses) for particular examples; on a more fundamental level, it does not resolve the problem of justifying the options in (20)-(23) as distinct types of lexical input to the pragmatic device. One of my aims in this thesis is to provide such a justification, and to separate the phenomena in (20)-(23) from either ambiguity or polysemy within a relevance-theoretic framework.[17]

1.4.2 A theory of utterance comprehension

Humans live and communicate within a certain cognitive environment: a set of facts and assumptions which are manifest to them. Facts and assumptions are manifest to individuals to the extent that the individuals can mentally represent them and accept them as true with a high degree of confidence. On this picture, human communication is for the most part an attempt to make a set of facts or assumptions manifest, or more manifest, to an audience; what communicators aim to do (and competent communicators succeed in doing) is to affect others' thoughts in a partly predictable way by affecting their cognitive environment.

The means of human linguistic communication, utterances, are instances of ostensive behaviour: this means that they call attention to themselves in a particular way. Generally, ostensive stimuli provide access to two layers of information: they make manifest to the addressee the intention of the communicator to make it manifest that she intends to inform the addressee of something. Consider the situation in which I point to a van selling ice-cream on a very hot day: my gesture is an ostensive stimulus which makes manifest to you my intention to make it manifest that I intend to inform you of something (:that we can get ice-cream from the van). The point about ostensive stimuli is that they give the addressee adequate reason to suppose that they have some

[17] As the reader will have noticed, any differences between the Cognitive Linguistic and the relevance-theoretic treatment of issues in lexical semantics are symptomatic of deeper disagreements about how to do cognitive science. I return to the theoretical underpinnings of Cognitive Linguistics in section 5.1.

significance which non-ostensive stimuli lack: in other words, ostensive stimuli, by demanding the addressee's attention, warrant expectations of relevance in a way that non-ostensive stimuli do not.

A stimulus is relevant to an individual to the extent that it causes cognitive effects for that individual.[18] There are three broad types of cognitive effect: (a) the stimulus may interact with previously held assumptions to yield new implications (*contextual implications*, as Sperber and Wilson call them); (b) the stimulus may contradict an existing assumption and result in its elimination from the addressee's mental repertoire; (c) the stimulus may offer support for an existing assumption and result in its strengthening in the individual's mental repertoire. Processing stimuli, however, requires some energy, or processing effort. This co-varies with factors such as the accessibility of the stimulus employed, its form (perceptual or linguistic complexity, length) and the size and accessibility of the chunk of assumptions in the addressee's mental repertoire which are required for the computation of cognitive effects. Relevance can, therefore, be seen as depending on a balance between effects and effort, or on the 'gains' from a certain stimulus and the cognitive energy it takes to retrieve those gains. The more weighty the gains are, the more relevant the stimulus becomes; the less effort is required to achieve those gains, the more the relevance of the stimulus is enhanced.

Utterances, like all ostensive stimuli, create a presumption of optimal relevance. This means that the addressee in a verbal exchange is entitled to assume that the conversational contribution which was directed at him was meant to offer him at least a satisfactory range of cognitive effects relative to the effort it would take to recover them, and to the rewards detachable by allocating that effort elsewhere. This is captured by the Communicative Principle of Relevance, which states:

> *Communicative Principle of Relevance:*
> Every act of ostensive communication (e.g. an utterance) communicates a presumption of its own optimal relevance.

[18] For an utterance to be genuinely relevant to the individual (as opposed to merely seeming relevant), the cognitive effects must lead to a genuine increase in knowledge (i.e. must represent facts, as opposed to false assumptions) or contribute positively in some other way to the achievement of cognitive functions and goals. These are called *positive cognitive effects* - see the Postface to the second edition of *Relevance* (pp.265-6) for discussion.

Because they create a presumption of optimal relevance, utterances are expected to be at least relevant enough in terms of effect and effort, to be worth the addressee's attention, and moreover to be the most relevant, in terms of effect and effort, that the communicator is willing and able to produce. This can be formally stated as follows:

> *Presumption of optimal relevance*:[19]
> (a) The ostensive stimulus is relevant enough for it to be worth the addressee's effort to process it, and
> (b) The ostensive stimulus is the most relevant one compatible with the communicator's abilities and preferences.

During the process of understanding an utterance, the hearer is often faced with a choice between several interpretations, all of which are compatible with the linguistically encoded content of the utterance. In the framework I have been describing, the hearer is justified in treating as the correct interpretation (and, therefore, the one which the speaker intended) the one which satisfies his expectation of relevance. This, in a nutshell, is an interpretation which the speaker might rationally have expected to be optimally relevant to the addressee.

On hearing an utterance, the addressee starts retrieving or constructing sets of mentally representable assumptions which might interact with his mental representation of the utterance. The set of mentally represented assumptions which the hearer may bring to bear on the interpretation process constitutes what Sperber and Wilson (1986/1995) call the *context* for utterance comprehension. Contextual assumptions will be retrieved or constructed according to their accessibility and will be processed together with the mental representation of the utterance to yield tentative interpretive hypotheses. These hypotheses will be tested against the hearer's expectation of relevance, i.e. his expectation (in normal circumstances) that the speaker will have aimed at, if not achieved, optimal relevance. The first hypothesis which is found to satisfy this expectation should be retained. A straightforward prediction of the model is that the hearer is entitled to assume that the first interpretation to satisfy his expectation of relevance will be the only one to satisfy his expectation of relevance -

[19] This is the revised presumption of optimal relevance which is included in the second edition of *Relevance* (1995).

hence the hearer will be entitled to conclude that he has reached the correct interpretation of the utterance.

Expectations of relevance constrain a variety of sub-phases of verbal understanding. Recall that the extraction of the proposition expressed by an utterance from the schematic representation provided by the utterance's linguistically encoded content is a pragmatic task, hence amenable to relevance considerations. The hearer's expectation of relevance helps in a number of ways in fleshing out the underdetermined logical form of the utterance into the complete truth-evaluable representation which (it is assumed) the speaker intended to convey: specific work has shown how disambiguation, reference assignment, enrichment and loosening are all guided by considerations of relevance (see, e.g., Wilson 1992, Wilson and Sperber 1993b, Matsui 1995, Carston 1993, 1996, 1997, 1998, Rouchota 1992, 1994b, Blakemore 1987, Blass 1990, and the contributions in Rouchota and Jucker 1998/forth.). As a brief illustration of how a relevance-based mechanism guides the utterance interpretation process, consider (24) as an exchange between two lawyers:

(24) Martin Gregg's case is difficult to handle.

I will focus on three aspects of the underdeterminacy in (24). Firstly, the hearer has to disambiguate *case*, which could mean (at least) 'lawsuit' or 'briefcase'. Secondly, he has to determine the interpretation of the possessive, which arguably encodes a very general relation between two constituents: in the above example, narrowing down the meaning of the possessive depends on the interpretation of *case*. Thirdly, *handle* may refer to a physical/manual manipulation or to a legal treatment. Suppose that Martin Gregg is another lawyer who has just undertaken the defence of an alleged paedophile. If this assumption is manifest to the interlocutors and accessible enough to the addressee, then it gives rise to the first interpretive hypothesis about the proposition expressed by (24). Very roughly, this first hypothesis is given in (25):

(25) The lawsuit which Martin Gregg is dealing with is difficult to handle.

Combined with highly accessible contextual assumptions about incidents of paedophilia, the legal difficulties presented, the sensitivity of the public, and so on, the hypothesised proposition expressed by (24) may give rise to an array of contextual implications which (it is assumed) the speaker intended to convey, i.e. an array of *implicatures*:

(26) Martin Gregg is very busy.

(27) We won't see much of Martin Gregg in the next weeks.

(28) Martin Gregg may lose this case.

(29) Martin Gregg's professional reputation is in danger because of this case.

To the extent that the set in (26)-(29) satisfies his expectations of relevance, and does so in a way the speaker could have foreseen, the hearer may conclude that he has reached the endpoint of comprehension and accept the hypotheses he has constructed as the intended interpretation of (24). Other interpretations remain linguistically possible, but are pragmatically dispreferred. It follows from the definition of optimal relevance that the hearer is not justified in going beyond the first acceptable interpretation and considering potential alternatives: this would incur additional processing effort on his part, which a competent speaker aiming at optimal relevance should manifestly have avoided.

The proposition expressed by (24) is (taken to be) an assumption which the speaker wanted to communicate, and is therefore the *explicature* of the utterance. Usually a speaker intends her utterance to make manifest (or to increase the manifestness of) a variety of assumptions, which go well beyond the (main/base) explicature of the utterance: implicatures are one such type of assumption. There is another type of communicated assumption which I want to introduce. In producing (24), the speaker might have intended any of the following to be made manifest (or more manifest) to her interlocutor:

(30) The speaker is saying that the lawsuit which Martin Gregg is dealing with is difficult to handle.

(31) The speaker believes that the lawsuit which Martin Gregg is dealing with is difficult to handle.

(32) The speaker asserts that the lawsuit which Martin Gregg is dealing with is difficult to handle.

(33) The speaker regrets that the lawsuit which Martin Gregg is dealing with is difficult to handle.

These further assumptions are produced by embedding the proposition expressed by (24) under speech-act descriptions or propositional-attitude reports. The resulting propositions (30)-(33) are called *higher-level explicatures* within relevance theory (Sperber and Wilson 1986/1996, Wilson and Sperber 1993a). The (optional) recovery of these further assumptions is performed through a combination of decoding and inference, as in the case of the 'base' explicature of the utterance. Often, the linguistic structure of the utterance suggests a particular attitude: the declarative form of (24) gives rise most naturally to a higher-level explicature such as (30). On other occasions, tone of voice, facial expression, etc. may give a hint as to the speaker's attitude towards the base explicature of the utterance (cf. (33)). Although part of the explicitly communicated content of the utterance, higher-level explicatures do not make a contribution to the truth conditions of the utterance: the truth conditional content of (24) is given in (25).

To conclude, I want to note that the partitioning of the information communicated by an utterance into explicit and implicit does not correspond to the semantics/pragmatics distinction: as the above example has shown, there are inferred (pragmatic) aspects of the explicitly communicated content of an utterance, both on the level of the base explicature and in higher-level explicatures.[20] In the main part of the thesis, I will be concerned with delimiting the contribution of semantic and pragmatic devices to explicitly conveyed information in verbal communication.

[20] For the most recent and thorough discussion of this point within relevance theory, see Carston (1998).

1.5 SUMMARY OF THE THESIS

The thesis is structured as follows. Chapter 2 is devoted to a detailed study of a sample of the English modal verbs: after giving an overview of previous semantic analyses of the English modals, I go on to present a relevance-theoretic account of their semantics and pragmatics. The main contention of the chapter is that the variety of interpretations the English modals exhibit is the result of interaction between contextual factors and their radically underspecified semantics. Departing from previous analyses, I propose an account of epistemic modality in terms of metarepresentation: since they mark logical relations between mental representations, epistemic expressions depend on human 'theory-of-mind' abilities and are expected to correlate with other aspects of human metacognitive capacities.

In Chapter 3, I concentrate on a series of arguments which have standardly been taken to support polysemy-based analyses of modality, and reanalyse them in relevance-theoretic terms. Firstly, I show that the alleged grammatical reflexes of the root-epistemic distinction should be treated as natural aspects of the interpretation process rather than semantically determined criteria for the distribution of root or epistemic readings. Secondly, I demonstrate that what appears to be non-truth-conditional behaviour in epistemic modality falls out from the metarepresentational properties of epistemic complements plus relevance-based considerations. Thirdly, I claim that the category of speech-act modality (accepted by some researchers as a separate type of modality) can be reanalysed as a distinct sub-type of the metarepresentational use of language. Fourthly, the diachronic emergence of epistemic meanings is shown to mesh with my analysis of epistemicity as a type of metarepresentation. It turns out that none of these areas offers good reasons to abandon the univocal semantic analysis advocated in chapter 2.

Chapter 4 explores the acquisition of modal terms and traces some intriguing connections between early linguistic and conceptual development; in particular, the chapter presents some evidence for the claim that epistemic modality involves metarepresentational (theory-of-mind) abilities and compares the onset and subsequent progress of development of root and epistemic interpretations in this light. The results from acquisitional data furnish some further support for my main analysis of modal expressions and against previous polysemy-based approaches. Towards the end of the chapter, I consider data from a

cognitive disorder (autism) in the light of the metarepresentation hypothesis for epistemic modality.

Chapter 5, building on the empirical arguments of previous chapters, offers a reconsideration of the phenomenon of polysemy in linguistic semantics and proposes a way of narrowing its scope; this has considerable implications for the psychology of word meaning in general. Moreover, the chapter argues that theories of polysemy often presuppose a number of questionable assumptions about the structure and attainment of concepts, and uses the example of Cognitive Linguistics to illustrate this point.

Finally, chapter 6 extrapolates from the main topic of polysemy in order to apply the analysis of modality put forth in the main body of this thesis to a different area: that of genericity, or characterising sentences. The attempt to bring together insights from the analysis of genericity and modality offers yet another perspective on the division of labour between semantics and pragmatics, one of my major concerns in this thesis.

Chapter Two

A Case Study: English Modal Verbs

2.0 INTRODUCTORY REMARKS

In this chapter, I introduce and defend a semantic and pragmatic analysis of (a sample of) the English modal verbs. I start by discussing previous analyses of modality in English with an eye to explaining how a cluster of related meanings (epistemic, root, and other) is expressed by the same set of lexical items (2.1). I then go on to develop a unitary semantic approach to the English modals, treating them as incomplete propositional operators (2.2). After defending the details of my semantic account, I show how the proposed semantics can give rise to the range of root interpretations modal verbs can receive in context (2.3). Epistemic interpretations require some further theoretical machinery, which I introduce and motivate in 2.4. Finally, I sketch the differences between natural-language interpretations of modal operators and their alethic/logical uses.

2.1 PREVIOUS ANALYSES

2.1.1 The ambiguity view

Many linguistic treatments of the English modals use as a starting point the traditional categories of epistemic and deontic modality, and supplement them with a range of additional types to capture the full range of meanings natural language modals may express. Consequently, English modals come out as multiply ambiguous items;

moreover, their candidate meanings seem to proliferate almost freely towards increasingly fine-grained classes.

Palmer (1990) provides a typical example of an ambiguity approach. He separates epistemic, deontic and simple root[1] modal meanings on both descriptive and explanatory grounds, and subsequently takes each modal verb to encode a particular cluster of distinct modalities. Thus, *may* encodes epistemic and deontic possibility (i.e. permission) and, arguably, simple root possibility, as shown in (1a-c) respectively:

(1) a. My boss may find this file interesting.
b. You may enter.
c. The mountain may be climbed from other points on this tour.

Can encodes simple root possibility, either subject-oriented - typically an 'ability' reading as in (2a) - or neutral - as in (2b); it also encodes deontic possibility, thereby conveying permission and, 'by extension/implication', command - see (2c) and (2d):

(2) a. Mary can tap-dance.
b. You can get lost.
c. You can come in casual dress.
d. You can forget about the bonus - you're not worth it.

May and *can* are interchangeable in some of their deontic and simple root uses - for instance, in (1b), (1c), (2c) - but normally *may* is considered either stylistically more sophisticated (Palmer 1990: 109-110), or more directly involving the imposition of a rule (ibid. p.104).

Must encodes epistemic, deontic or simple root (again, subject-oriented or neutral) necessity, as shown in (3a-d) respectively:

(3) a. You must be joking.
b. We must leave immediately.
c. You just must go around asking these indiscreet questions!

[1] By 'simple root' I refer to Palmer's 'dynamic' interpretations (see 1.3).

d. John must go if he wants to catch the bus.

As for *should*, it linguistically encodes tentative or conditional necessity in either the epistemic or the simple root realm - although Palmer acknowledges that the verb occasionally has 'highly deontic characteristics' (ibid. p.82):

(4) a. You should be meeting them later on today.
b. The doctors keep warning my uncle: he should really cut down on smoking.

Quite often, an utterance containing a modal may be interpreted in more than one way: (5) may receive a deontic, simple root or epistemic interpretation (ibid. p.54). In this and similar cases, the intended interpretation is pragmatically selected from the range of candidate senses furnished by the grammar:

(5) Something must happen next week.

I want to argue that the ambiguity view faces a number of problems, both descriptive and explanatory. To begin with, intuition suggests that there are clear differences between the phenomenon of classic lexical ambiguity exemplified by *port* in (6) and the type of 'meaning multiplicity' which characterises the modals; the latter seems to be motivated in a sense which goes well beyond simple ambiguity:

(6) This port is justly famous.

There are more concrete arguments that this intuition points in the right direction. First, the categories introduced by the ambiguity view do not really correspond to distinct senses for the modals, among which it is always possible to choose. For one thing, the distinction between the two kinds of simple root modality is far from clear. Consider (7) (taken from Palmer 1990: 85):

(7) One thing you want to avoid, if you possibly can, is a present from my mother.

Here, there is no way of distinguishing whether *can* expresses what is possible in a 'neutral' root sense, or what the subject has the ability to do.[2] This indeterminacy is not due to lack of sufficient contextual information, but is rather caused by the fact that the 'neutral' root reading subsumes the 'subject-oriented' reading.

A similar situation arises in (8), where the boundaries between the two categories become blurred: *can* in (8a) expresses 'subject-oriented' root modality, but in (8b) it conveys 'neutral' root modality, which subsumes the 'ability' reading of (8a):

(8) a. Mary can speak German.

b. Mary can speak German at the meeting because everybody is going to understand her.

Problems also appear in the broader distinction between simple root and deontic modality. As (9) shows, simple root *can* is capable of conveying a deontic meaning:

(9) You can be the first person to join our forces at such a young age.

Palmer concedes that permission readings may be pragmatically derived from root possibility ones; if generalised, this claim would open the way towards treating all 'performative', deontic meanings of modals as products of pragmatic interpretation and not of semantic decoding processes.

A second argument against the multiple ambiguity of the modals comes from the inability of the set of their ascribed senses to capture the range of meanings they may convey. Groefsema (1995) mentions the example:

(10) You must come to dinner sometime.

None of the meanings provided above for *must* accounts for the normal interpretation of (10), which is something like (11):

[2] Essentially the same argument applies against Bolinger's (1989) analysis of *may* and *can* in terms of (respectively) extrinsic possibility and intrinsic potentiality.

(11) We would like you to come to dinner sometime.

In a similar fashion, *can* may be used to communicate more than its proposed semantics would suggest (cf. Walton 1988: 103):

(12) a. You can clean the house for once.
b. Can you pass the salt?
c. Can I get you a drink?

The ambiguity view may attempt to incorporate such meanings in two ways: either by introducing semantic labels for them and thus inflating an already overloaded semantic component (see, e.g, Leech 1987), or by hiving them off to 'conventions of usage' or 'pragmatic extensions' (see Palmer 1986, 1990). In either case, descriptive adequacy will be achieved only at the expense of a truly explanatory account of the semantics and pragmatics of the modals.

Although the proponents of the ambiguity view may offer different accounts of the modals, they are all subject to the above criticisms. For instance, Coates (1983) tries to accommodate the richness of possible interpretations of each modal verb (its 'indeterminacy') by representing its meaning as a fuzzy set (see also Leech and Coates 1980). The indeterminacy is then attributed to the gradience between the semantic core and the periphery of each modal. In the case of *can*, for example, the continuum of meaning extends from the core of 'ability' to the periphery of 'possibility'; gradience is manifested in utterances like (13), where it is difficult to adjudicate between the two meanings:

(13) All we can do is rake up somebody like Piers Plowman who was a literary oddity. (Coates 1983: 92)

Other sources of indeterminacy are ambiguity - cf. (5) above - and merger - cf. (7). As for *must, may,* and *should,* their deontic and simple root aspects are grouped together under 'root' and are attributed distinct fuzzy set meanings from their epistemic counterparts.

Coates' account again suffers from an excessive reliance on semantics to provide the whole array of meanings communicated by the modals; as a result, she constantly has to expand the semantic component so that it includes information about the degree of subjectivity or strength of the modality. Even then, the absence of a pragmatic component from her analysis makes it impossible to explain examples of the sort in (10)-(12). As shown by the use of the term 'indeterminacy', Coates is primarily worried by the inadequacy of semantic labels to yield an empirically satisfactory analysis of the modals: however, no problem would arise if this indeterminacy were seen as resulting from the flexibility of pragmatic interpretation. The proof that there is no need for recognising phenomena such as gradience or merger is that these phenomena do not actually have any visible effect on the comprehension process: contrary to what one would expect on Coates' account, utterances of the sort in (7) are not more difficult to understand than (2a), an utterance conveying the 'core' meaning of *can*. This intuitive estimate seems to be supported by recent psycholinguistic research, which has consistently singled out and tested utterances of the type in (12) - especially (12b) - for speed of comprehension, thereby supporting the view that this class of utterances may cause some interesting processing complications; no similar hypothesis has ever been considered for Coates' gradience or merger examples (for experimental results, see Gibbs 1994: 88-91).

To summarise: although the fundamental point of the ambiguity-based approach is the rigid distinction between (roughly) the epistemic and non-epistemic 'meanings' of the modals, both Palmer and Coates are forced to recognise a wide range of intermediate cases, where for a variety of reasons the proposed semantic distinctions prove inert, indistinguishable or insufficient. These cases, however, may be viewed as a threat to the overall validity of the ambiguity position. A more viable alternative, which I have already hinted at, would explore the view that traditional categories of modality are effectively by-products of the comprehension process rather than stable and basic semantic information guiding pragmatic interpretation. A more satisfactory account of the modals should then offer a more parsimonious semantics and a richer pragmatics; the latter should be able to deal with issues of politeness, style or illocutionary force. Moreover, it should explain why epistemic and root meanings can be conveyed by the same class of lexical items.

This last issue brings us to a modification of the ambiguity view, put forth by Sweetser (1990).

2.1.2 The polysemy view

Sweetser (1990) places her discussion of modality within a more general study of polysemy in natural language. Adopting a broader Cognitive Linguistic framework, she claims that polysemy is often motivated by a metaphorical mapping from the concrete, external world of socio-physical experience to the abstract, internal world of reasoning and of mental processes in general. She argues that modal verbs display a similar, motivated polysemy, thus rejecting the 'standard' view that they are ambiguous between unrelated senses.

Sweetser uses as a basis for the semantics of the modals Talmy's (1988) notion of 'force dynamics'. Root modals are taken to encode force-dynamic notions in the external world: for instance, *may* encodes the existence of a potential but absent barrier, *must* a positive compulsion, and *can* either a positive ability on the part of the doer, or some potential force/energy. These notions are extended metaphorically into the internal, 'mental' domain and give rise to epistemic meanings: *may* and *must* thus come to denote barriers or forces operating in the domain of reasoning. To illustrate: (14') - (17') give pragmatically enriched paraphrases of the semantic content of the utterances in (14) - (17) respectively; (14) and (15) are examples of root modality, whereas (16) and (17) exemplify epistemic uses of modals:

(14) You may spend this sum any way you wish.

(14') You are not barred (by some or other authority) from spending this sum any way you wish.

(15) You must be back by midnight. (Our parents said so).

(15') The direct force (of our parents' authority) compels you to be back by midnight.

(16) The butler may have committed the murder in the meantime.

(16') I am not barred by my premises from the conclusion that the butler has committed the murder in the meantime.

(17) The guests must have had a really good time.

(17') The available evidence compels me to the conclusion that the guests had a really good time.

On this account, the metaphorical mapping between root and epistemic senses is part of the semantics of English, i.e. it has become conventionalised. For individual occurrences of modal items, it is the task of pragmatic interpretation processes to decide which of the two domains (root or epistemic) is the intended one, i.e. to resolve the structured polysemy in the modal semantics.[3]

Sweetser believes that an account based on 'modality in two worlds' explains the acquisitional and historical priority of the root over the epistemic meanings of the modals.[4] However, although her approach correctly moves in the direction of supplying motivation for the systematic relation between root and epistemic uses of modal expressions, it cannot avoid some of the criticisms directed against the ambiguity view. For instance, distinctions between root/epistemic or ability/potentiality readings imply, first, that it is always possible to choose between them, and second, that cases of gradience or merger should be more difficult to comprehend; we saw that neither of these conclusions is warranted.

In the second place, even if one adopts the idea of a metaphorical mapping among modal concepts, this mapping will come out as very different from other examples of metaphorical mapping which have been claimed to motivate lexical polysemy. Consider the case of perception terms, which have displayed a cross-linguistic tendency to develop meanings related to mental processes (cf. *see*, *view*, etc.). According to Sweetser (1990: 23ff.), this can be explained in terms of a metaphorical construal of the internal world delivered by reasoning on the basis of the external world delivered by perception: the semantics of perception terms thus includes a metaphorical mapping which relates two independent and distinct senses. In the case of modals, however, the senses allegedly linked through metaphor are not so distinct, as a range of indeterminate examples in the previous section has demonstrated. Consequently, even if we grant that metaphorical mappings exist in the case of perception verbs, the parallel between these and modals is not straightforward.

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[3] See also Langacker (1991: 273ff.) for a polysemy-based approach to modals which builds on Sweetser's results.

[4] Sweetser goes on to tentatively propose a further mapping of force dynamics in modal verbs, this time into the speech act domain; I postpone the discussion of that part of her proposal until chapter 3.

A third problem for the proposal based on a metaphorical extension of modal meanings is that its application is constrained in various ways. An obvious case is positive *can*, which is not normally used epistemically. Sweetser's account cannot handle similar examples, as she herself acknowledges (1990: 154). Sweetser tries to turn this into an argument against a unitary semantic approach to the modals: 'It is not the case (as we might expect if the modals were simply monosemous) that all root modals must/can have epistemic uses - this is neither historically true for the English modals nor a cross-linguistic universal' (1990: 68). It is not necessary, however, for a monosemous account to make such an assumption; on the contrary, a single semantics for the modals could leave room for a pragmatic explanation of the gaps in their distribution.

There is also something to be said on the historical basis of Sweetser's arguments, namely the precedence of the root over the epistemic meanings. In the first place, there seems to be some evidence against the priority of root meanings. Goossens (1982) claims that epistemic uses of the modals existed in Old English, though they had a more restricted distribution than root ones. For instance, *magan* ('may') had already begun to express epistemic possibility, while other root modals like *willan* ('will') and *sculan* ('shall') were occasionally used to express epistemically coloured predictions. Although he claims that there was no modal counterpart for the present-day English epistemic *must*, Tanaka (1990) argues that *sculan* took up the position corresponding to the latter.

In the second place, semantic change in the modals did not involve only their root and epistemic meanings, but also took place between two root senses. For example, Shepherd (1982) reports the semantic development of *can* from initially expressing intellectual capacity in Old English to expressing general capacity and later possibility or permission. This, according to Tanaka (1990), was partly due to *can* taking over parts of the meaning of Old English *may*, which consequently changed from expressing general ability to expressing permission and possibility.[5] It seems, therefore, that the historical development of the meanings of the modals cannot be explained in terms of a simple metaphorical mapping along the lines proposed by Sweetser. In any case, the extent to which diachronic evidence is relevant for a synchronic analysis of linguistic competence is a fairly controversial issue. Even if root meanings were the first to appear, the semantics of the English modals may well have developed towards a unitary meaning. As for the

[5] My discussion of the historical arguments has drawn heavily on Groefsema (1995: 59).

development of epistemic interpretations in items which initially encoded root concepts, there may be alternative explanations; I will briefly explore one such alternative in the appendix to chapter 3.

Polysemy-based accounts of modal expressions in English and other languages have also been advocated by a variety of scholars, especially within the grammaticalisation literature (Bybee 1988a, 1988b, Bybee and Fleischman 1995, Bybee and Pagliuca 1985, Bybee, Perkins and Pagliuca 1994, Heine, Claudi and Hünnemeyer 1991, Traugott 1982, 1988, 1989, 1995, Traugott and König 1991; cf. also Nuyts 1993, Chung and Timberlake 1985, Lyons 1977, Halliday 1970); I will not examine these proposals in any greater detail here (although see chapter 3 for relevant comments). The conclusion from the discussion so far seems to be that neither the ambiguity nor the 'motivated polysemy' approach can give a plausible semantics for the English modals.

2.1.3 The monosemy view

An obvious way of avoiding the problems of ambiguity/polysemy is to adopt a common core for the meaning of each modal, and to use it as a basis for deriving the vast range of possible interpretations which the modals may contextually receive. In this way, one might also account for the fact that 'there is an intuitively obvious connection, on the one hand, between the notions of necessity and obligation, which are relevant to the semantic analysis of sentences containing 'must', and, on the other, between the notions of possibility and permission, which are relevant to the semantic analysis of sentences containing 'may" (Lyons 1977: 791).

Earlier monosemous approaches to the English modals include Ehrman (1966), Wertheimer (1972), Tregidgo (1982), Perkins (1983), Haegeman (1983) - see also Groenendijk and Stokhof (1976). Here, I will review in some detail two proposals which have adopted a precise, formally statable semantics for modals, and a sound division of labour between semantic and pragmatic aspects of the comprehension of modality.

2.1.3.1 Kratzer's account

Kratzer (1977, 1981a, 1991) provides an analysis of modality couched within a possible-

worlds framework. To explain how modality functions in such a framework, Kratzer (1981a) introduces three factors which jointly underlie modal operators: the *modal relation*, the *modal base* and the *ordering source*. The modal relation includes essentially the notions of possibility and necessity, or what the symbols ◊ and □ of modal logic are designed to capture. The modal base (or *conversational background*) involves a set of assumptions against which the modal relation can be understood. These sets are expressible with the phrase *in view of*: Kratzer's theory includes, for instance, epistemic modal bases (where a given modality is understood to hold in view of what is known), teleological modal bases (where modality is understood to hold in view of one's aims), deontic modal bases (where modality applies in view of what is commanded), etc. These are exemplified in the uses of *must* in (18a-c) respectively:

(18) a. Isolde must be Sigmund's sister: they have the same smile.

b. I must buy a bicycle to get to college quickly every day.

c. Soldiers must do their duty.

In (18a), in view of the available evidence, Isolde is necessarily Sigmund's sister. In (18b), in view of the speaker's aim to get to college quickly every day, it is necessary for her to buy a bicycle. In (18c), given certain orders, it is necessary for soldiers to perform their duty. Kratzer postulates a long list of modal bases, which further include categories such as stereotypical or buletic (related to wishes); all of these are formally treated as sets of possible worlds over which quantification by the modal operator takes place. Not all conversational backgrounds are the same for every possible world - obviously the epistemic conversational background in a world where there is no space travel is different from the one in the actual world. Kratzer points out that modal expressions are context-dependent and vague, since the sort of modal base which will be selected for their interpretation is determined pragmatically (often by some rule of accommodation of the sort proposed by Lewis 1979).

Not all worlds contained in a modal base are taken into account in the interpretation of an utterance containing a modal. For instance, in (18a) the speaker does not consider the possibility that Isolde has the same smile as Sigmund because they have spent hours in front of a mirror imitating each other, or the possibility that the similarity in

their smile is mere coincidence. Why should that be? A first approximation is that worlds containing these states of affairs are further removed from the actual world and not easily *accessible* from it; they represent 'wilder' possibilities, which need not be taken into account. More precisely, they are removed from what we take to be the normal course of events, or the causal relations that hold among states of affairs. Therefore, we need an *ordering source* which will rate worlds in terms of similarity to the normal course of events and specify the minimal degree of 'distance' from normalcy a world should satisfy. The closer a world is to normal conditions (usually, what holds in the actual world), the more probable it is that a modal relation will be understood to hold in that world. Modal bases come with different ordering sources: in the case of epistemic modal bases, a departure from what is known is not such a serious offence; in the case of deontic bases, however, even a slight breach of what is commanded is more problematic. The idea of an ordering of possible worlds along the lines of similarity belongs to David Lewis (cf. his theory of counterfactuals outlined in Lewis 1973a; see also Lewis 1981, 1986).

In this system, a proposition is a human necessity (cf. the relation expressed by *must*) in a world w in view of a modal base and an ordering source iff it is true in all those accessible worlds which come closest to the normal (incidentally, since the order is not total, there can be more than one 'most normal' world). A proposition is a human possibility in a world w in view of a modal base and an ordering source iff its negation is not a human necessity in that world. Depending on the type of the modal base selected, modal expressions are capable of expressing more specific kinds of necessity or possibility (epistemic, dispositional, circumstantial, etc.). Recall (18a), repeated below as (19): the semantic content of the utterance can be paraphrased as in (19'):

(19) Isolde must be Sigmund's sister.

(19') In all those epistemically accessible words which come closest to the normal, Isolde is Sigmund's sister.

In other words: in all worlds which do not depart radically from what we know, Isolde is Sigmund's sister. Different modals encode distinct clusters of modal relations, modal bases and ordering sources, as Kratzer (1981a) demonstrates with respect to German modal verbs.

The picture I have outlined is certainly appealing as an abstract description of how the semantics of modality operates. Kratzer's proposal is particularly successful in assigning to modal expressions a weak semantics, which together with additional contextual considerations yields epistemic, deontic, etc. interpretations. However, there are a number of problems, both traditional and new, which the theory has to face.

First, the possible-worlds model is not meant as a psychologically plausible model of how speakers represent and handle alternative possibilities. In fact, the model as it stands rather runs counter to experimental findings, which have consistently attested that human subjects have difficulty with the systematic mental manipulation of even a few alternatives (Johnson-Laird 1982). The psychological reality of possible worlds is the subject of a long and heated debate which falls outside the scope of the present discussion.[6] One way out would be to suggest that worlds do not correspond to full-fledged representations of states of affairs but to partial specifications of them, or *situations*; another would be to assume that sets of possible worlds are not individually represented but subsumed under a single description.[7] In the best case, the theory as outlined above should be taken to capture some facts about the speaker's semantic competence while remaining neutral as to how this competence is to be cognitively represented (see similar suggestions in Stalnaker 1986: 120-1).

Now some more immediate points about Kratzer's analysis. We saw that it is not designed to fit with a cognitively informed pragmatic theory. Still, it seems that two of the three components of modality, namely the conversational background and the ordering source, involve non-linguistic knowledge and consequently belong to pragmatics (Kratzer herself makes vague but repeated references to the role of contextual factors in the overall comprehension of modals). The way pragmatics is dealt with in her account, however, is at least dubious.

For one thing, the idea of a fixed inventory of conversational backgrounds favouring one modal interpretation over others presupposes a rigid and inflexible conception of the role of context in comprehension. In this sense, it reflects earlier views in

[6] For some criticisms, see Smith (1983), Smith and Smith (1988).

[7] Kratzer (1980), arguing against the view that possible worlds are incompatible with finite brains, shows that to know a set does not necessarily require a discrete mental representation of all its members; therefore, a given set of possible worlds need not require an individuated mental representation but may be stored under a single description (see also Partee 1989: 117ff., 1977). A similar proposal for the mental representation of time was put forth by Hans Kamp and is discussed in Johnson-Laird (1982).

the literature on communication, according to which context was a determined/'given' chunk of information fixed independently of the utterance (see, e.g., Brown and Yule 1983). As Sperber and Wilson (1986/1995) have shown, however, constructing the context for understanding an utterance is part of the interpretation process, constrained by general pragmatic principles.

Moreover, one can express serious doubts as to the usefulness and feasibility of an abstract (and absolute) ordering of possible worlds in terms of similarity to an actuality/normalcy standard. The point is that, whatever the ontological status of possible worlds, their similarity ratings are a cognitive and thus subjective matter. Even as ardent an adherent of modal realism as Lewis rejects the possibility of objectively measuring similarity among worlds (e.g. by mathematical methods). He admits: 'Overall similarity consists of innumerable similarities and differences in innumerable respects of comparison, balanced against each other, according to the relative importances we attach to these respects of comparison. Insofar as these relative importances differ from one person to another, or differ from one occasion to another, or are indeterminate even for a single person on a single occasion, so far is comparative similarity indeterminate' (Lewis 1973a: 91; see also the well-known puzzles of Goodman 1970). In a more revealing excerpt Lewis points out that our perception of similarity makes little use of the vast inventory permitted by logic: interlocutors expect each other to remain within a relatively limited range of inter-world similarity, and it is natural to have vocabulary conventionally reserved for use within this range (1973a: 94). In what follows, I will take seriously the idea that humans obey cognitive and communicative constraints in their assessments of similarity (and, in particular, similarity among worlds); indeed, in a later section, I will show that the 'limited vagueness' of similarity which Lewis noted can be attributed to relevance-based limitations in construing plausible alternatives to the actual world.[8]

Kratzer explicitly states that she does not want 'to get into the mess of context theories' (1977: 343), and intentionally limits herself to a mere sketch of pragmatic aspects of meanings communicated by modal expressions. Obviously, an adequate pragmatic framework including a theory of context selection could be far more explanatory than a

[8] Interestingly, Kratzer (1989) in her analysis of counterfactuals points out - without explanation - that, in determining the set of propositions relevant for their truth, only 'humanly graspable' propositions should be considered; cognitive factors are thus again indirectly introduced in the formal analysis (cf. Kratzer 1981b).

classification of the contextual specifications of the meaning of modals, which is bound to fail even on descriptive grounds (see the cases of gradience or merger in section 2.1.1). Still, Kratzer's model offers important insights into modality, and I will return to some of its features in the discussion to follow.

2.1.3.2 Groefsema's account

Groefsema's (1995) analysis, cast in a relevance-theoretic framework, sets out to bridge the gap between the unitary semantics and the diverse pragmatics of modals.[9] Groefsema proposes the following semantics for *can*, *may*, *must* and *should*:

Can: p is compatible with the set of all propositions which have a bearing on p.
May: there is at least some set of propositions such that p is compatible with it.
Must: p is entailed by the set of all propositions which have a bearing on p.
Should: there is at least some set of propositions such that p is entailed by it.
(where p is the proposition expressed by the rest of the utterance)

'Bearing' is defined as a formal relation between propositions (Groefsema 1995: 62): a proposition P positively has a bearing on proposition Q iff

a) [Q] or [~Q] follows from P, or

b) [Q] or [~Q] follows from P and the minimal set of propositions X which, together with P will yield [Q] or [~Q] (condition: [Q] or [~Q] doesn't follow from X alone).

A proposition P negatively has a bearing on proposition Q iff

a) [Q] or [~Q] follows from ~P, or

b) [Q] or [~Q] follows from ~P and the minimal set of propositions X which, together with [~P] will yield [Q] or [~Q] (condition: [Q] or [~Q] doesn't follow from X alone).

Groefsema goes on to point out that 'in informal terms, what the notion of bearing does is to focus the addressee's attention on all the *evidence* (of whatever nature,

[9] Smith (1989) contains an early proposal for treating *must* as monosemous within a relevance-theoretic framework. Other relevance-theoretic accounts of the English modals include Walton (1988) and Klinge (1993); I concentrate on Groefsema's proposal, since it is the most fully and articulately developed.

epistemic or otherwise) for the proposition expressed by the rest of the utterance' (ibid. p.62-3, her emphasis). Depending on the sort of evidence available and its relation to the embedded proposition p, an utterance containing a modal verb will be interpreted epistemically, deontically, etc. The interpretation process will always be constrained by the criterion of consistency with the principle of relevance.

Groefsema's account undoubtedly moves the study of modals forward by adopting a well-worked out division of labour between semantic content and pragmatic interpretation. I agree with a lot of individual points in her analysis and find the case she makes for bare modal semantics quite compelling. However, there are several remarks to be made about the details of her account. To start with, the crucial notion of bearing seems to be rather artificial when one considers how modals are actually used in communication. Take an epistemic interpretation such as that in (20), where the notion of evidential support intuitively makes more sense:

(20) Sue and John must be a couple.

On anyone's account, epistemic *must* conveys that the embedded proposition - say, p - follows from a set of 'background' propositions/evidence available to the speaker. Groefsema allows for two ways in which this can happen: evidence can either positively or negatively have a bearing on p. In the former case, the speaker must have had in mind something like the following: 'p is entailed by the set of all propositions which positively have a bearing on p' - i.e. either i) entail p or ~p, or ii) are members of the minimal set of propositions which jointly entail p or ~p. On (i), (20) turns out to be either a tautology or a contradiction, and it definitely is neither; (ii), to the extent that it is intelligible, leads to the same results as (i). Groefsema's account has not given us a plausible semantics to use as a starting point in order to pragmatically flesh out what (20) communicates.

What about the possibility of the evidence negatively bearing on p? In this case, the speaker in (20) must have reasoned as follows: 'p is entailed by the set of all propositions which negatively have a bearing on p' - where this set includes either i) propositions whose negation entails p or~p, or ii) propositions whose negation is a member of the minimal set of propositions which jointly entail p or~p. The problem with this is that, in drawing a conclusion, we rarely - if ever - consider the *negation* of the available evidence; we may

consider a varying *range* of evidence, but to depart from what we know to be the case would have little foreseeable cognitive gain. In (20), it does not seem possible to construct a context in which the speaker could plausibly reason on the basis of propositions with a negative bearing on the embedded assumption: if, for instance, the speaker's evidence in (20) consists (roughly) of the propositions in (21), it is difficult to see what role their negation could play in producing (20):

(21) a. Sue and John walk hand in hand.

b. A boy and a girl do not walk hand in hand unless they are a couple.

Apart from issues of production, there is also an issue of comprehension of 'negative evidence': although the propositions which have a bearing on p are not always retrieved by the hearer, Groefsema allows this to happen if it is crucial for establishing the relevance of an utterance containing a modal verb (1995: 69). However, there do not seem to be any occasions on which hearers work out what the negative evidence for the conclusion [Sue and John are a couple] is or could be, let alone believe that the speaker would wish to make such evidence manifest by uttering (20). Interestingly, nowhere in the vast literature on modality and evidentials is there any mention, as far as I know, of the role of negative evidence, and this squares well with both intuition and empirical facts about the comprehension of modal expressions. Groefsema herself in practice abandons her technical definition by ignoring negative bearing; in analysing actual examples, she makes exclusive use of positive bearing in conjunction with a pretheoretical notion of evidence. This is no coincidence, since both of these notions hook onto something intuitively closer to modal meanings than their formally developed but somehow artificial counterparts which she previously proposed.

I have a number of other objections to Groefsema's account. For instance, as already mentioned, Groefsema believes that only on some occasions is the hearer justified in looking for the specific propositions that have a bearing on p. However, it seems that, in order to understand a modal utterance, the hearer has to recover at least a broad specification of the *sort* of propositions that have a bearing on p, so that he can retrieve one or other type of modal interpretation. As an example of a case where the addressee does not have to work out what the evidence is, Groefsema offers the following:

(22) Ann must be at Heathrow by now.

She comments that the hearer can conclude from (22) that all the evidence available to the communicator entails that Ann is at Heathrow (at a given time): if the hearer trusts the communicator to know enough about Ann's movements, he will not have to work out what this available evidence is but can simply infer that Ann is at Heathrow (ibid. p.69). It seems, though, that even in this example, the hearer had to compute the *type* of evidence (i.e. epistemic), even though not the individual assumptions, which the communicator entertained and used as 'grounds' for her utterance.

Groefsema makes a further comment on the interpretation of (22). Following Walton (1988), she remarks: 'if the addressee does not believe that the communicator actually knows anything about Ann's movements, s/he will interpret [22] not as a description of an actual state of affairs, but rather as a description of a desirable state of affairs' (1995: 69) - whereby (22) yields (22'):

(22') The speaker desires that $_q([_p$Ann be at Heathrow by time t] is entailed by the set of all propositions which have a bearing on p).

This seems distinctly odd to me: how can one desire that a certain entailment relation exist? What is more, if something is desirable, shouldn't it be that Ann be at Heathrow (at a specific time), rather than what q in (22') denotes? More to the point: why not simply assume that the speaker is making a wild guess based on scarce evidence, in which case we would have a normal epistemic interpretation, albeit affected by manifest assumptions about the speaker's access to information about Ann's whereabouts?

In the following section, I want to sketch how an alternative analysis might go. Although it has similarities to both Kratzer's and Groefsema's accounts, this analysis departs in significant respects from previous approaches to modality.

2.2 MODAL VERBS AND SEMANTIC UNDERDETERMINACY: A PROPOSAL

2.2.1 Background: tripartite structures in quantification

The semantics I am going to propose for modal verbs is based on an assumption already familiar from other monosemous approaches: modals are context-dependent expressions, in that their linguistic semantics radically underdetermines the overall meaning they communicate. I assume, partly agreeing with Kratzer, that the semantic content of modals consists of two components: a logical relation R (basically: entailment or compatibility), and a domain D of propositions. Roughly, then, what the modals are used to convey is that a certain proposition p bears a certain logical relation R to the set of propositions in a propositional domain D, or, schematically:

(23) R (D, p)

The structure in (23) is an instance of a general tripartite structure which has been proposed for a number of quantificational devices in natural language, such as conditionals, *when*-clauses, quantificational determiners (*everyone, all*) or adverbs (*always, generally, often* - see Lewis 1975, Heim 1982, Farkas 1981, Farkas and Sugioka 1983, Schubert and Pelletier 1989, Partee 1989, 1995a, Roberts 1989, 1995; cf. also chapter 6). This tripartite structure has the following form (Krifka, Pelletier, Carlson, ter Meulen, Link and Chierchia 1995):

(24) OPERATOR (Restrictor, Matrix)

The operator takes scope over the proposition in the matrix and relates it to another proposition (the restrictor). In the case of modals, the operator is the logical relation (entailment or compatibility), the matrix is the embedded proposition p and the restrictor is the domain of propositions which the matrix is being placed in relation to; it is the restrictor that is responsible for the different types of modal concepts which a modal expression is capable of expressing in different contexts. As is often the case with tripartite

quantificational structures, the restrictor in modals may be either linguistically present, as in (25a), or pragmatically inferred, as in (25b):

(25) a. In view of the political situation, you must leave the country.
b. You must leave the country.

Regardless of the linguistically realised or null form of the restrictor in the surface structure of the modal utterance, the semantic content of a modal item may make reference to the possible restrictors (i.e. domains of propositions) it admits; alternatively, the semantic entry may remain silent as to the admissible restrictors, thereby leaving their specification entirely to the domain of pragmatic processing. It will turn out that both cross-linguistic comparison and historical change in the semantics of modal expressions mostly turn on facts about/developments in the type of admissible restrictors. For the moment, however, I want to explore the differences within a subset of the English modals as to the modal relations and restrictors specified by the semantics of each of its members.

My analysis of the semantics of modals will proceed in three steps. Firstly, I will develop the notion of domains of propositions which may serve as restrictors for modal operators. Secondly, I will introduce semantic analyses for a sample of the English modal verbs which includes *may*, *can*, *must*, and *should*. Thirdly, I will elaborate on the specific types of context-dependence exhibited by modal verbs by motivating both 'pragmatic saturation' and 'pragmatic enrichment' analyses to deal with individual modals. I will consider each step in turn.[10]

2.2.2 Domains of propositions as modal restrictors

Following Sperber and Wilson (1986/1995, Sperber 1997), I assume that any given proposition can be entertained and stored in memory in several different ways. Firstly, and most obviously, a proposition can be entertained as a truth-conditional description of a state of affairs in the actual world - in different terms, a factual assumption (a case of what relevance theory calls the *descriptive* use of propositions - see Sperber and Wilson

[10] Versions/parts of the semantic analysis of the modals I propose here appear in Papafragou (1998a, 1998a/forth., 1998c/forth.).

1986/1995). Factual assumptions are the means whereby we represent reality to ourselves. They come in two main varieties: on the one hand, there are factual propositions describing wide-ranging, empirical generalisations about classes of objects and events; on the other hand, there are specific factual propositions concerning instances of events or particular individuals at given temporal and spatial locations. Factual assumptions are the default (or 'base') type of assumption for the purposes of communication, since they form a rich and highly accessible contextual background against which ostensive stimuli are processed. Propositions describing the actual world (in either past, present, or future manifestations) can thus be considered to belong to a single domain - the *factual* domain.

Other domains of propositions include more constrained systems of laws, regulations or rules; I will call them *regulatory* domains. Regulatory domains include legal rulings, chess rules, laws of biology or chemistry, etc.

Similar to these are domains in which propositions are handled as descriptions of states of affairs in ideal, or stereotypical worlds; at least as far as a sub-case of ideal-centered domains, the domain of moral beliefs, is concerned, there has been some evidence that it is stored and handled by a purpose-specific internal module (Premack and Premack 1994).

Yet other types of domain may involve propositions which are handled as descriptions of states of affairs in worlds desirable from someone or other's point of view. Desirability is a three-place predicate: an individual can entertain an assumption as a description of a state of affairs in a world desirable from that individual's or someone else's point of view (Wilson and Sperber 1988a).

Finally, propositions can be entertained and stored as abstract representations (i.e. hypotheses), or abstract representations of representations (where the initial representation may or may not be attributed to some source); these are examples of what relevance theory calls the *interpretive* use of propositions, and will come out as a separate domain of propositions (for further elaboration of this last type, see section 2.4).

On this picture, then, propositions come with an in-built index, or indication of their type. In factual assumptions this index is null, since these assumptions are the default case of representing the world; in other types of assumptions, I assume that there is an indication in the language of thought as to their domain, i.e. the sub-part of the actual

world or an alternative world they are taken to be descriptions of. Logical relations such as entailment or compatibility apply only among propositions of a given type.[11]

I should point out at this stage that I intend these types of domains to be neither exhaustive nor mutually exclusive. It is fairly obvious, for instance, that normative and ideal-centered domains will overlap; likewise, to the extent that the actual world furnishes instantiations of laws of nature, some phenomena will be described by propositions in both the factual and, say, biological domains. Moreover, this discussion is by no means intended to imply that propositional domains are rigid and pre-constructed mental structures (cf. my criticism of Kratzer's 'conversational bases'); I rather intend them as a sort of file-based organisation of our belief-desire system, which has a rich enough internal structure to be updated and expanded through the formation of novel domains. For purposes of constructing a framework for modality, domains of propositions establish a notional space which fulfils a two-fold purpose: in the first place, it serves as a basis for the pragmatic computation of restrictors for modal relations. In the second place, it provides a conceptual pool for grammaticalisation processes to draw on. As I have already suggested in my general discussion of restrictors, individual modal expressions will come out as permitting different kinds of domains of propositions as restrictors; consequently, domains of propositions will prove a useful tool for describing and comparing modal items in the same or different languages, or for tracing historical developments in modal meanings. Even if it turns out that it is wrong to treat domains of propositions as underlying mental structures, or (when grammaticalised) as contributions to semantic meaning, they can nevertheless be considered as a useful way of thinking about modal structure.

2.2.3 Semantics for modal operators

I now want to introduce the semantics for a subset of the English modals. I propose that the information grammatically assigned to *may, can, must* and *should* is the following (where p is the embedded proposition, i.e. the proposition expressed by the rest of the

[11] The idea that propositions are organised in domains has been around for some time; its construals differ depending on the content which different proposals have ascribed to the term 'proposition'. For relevant discussion I refer the reader to Kuroda's (1982) 'indexed predicate calculus', Fauconnier's (1985) 'mental spaces' and Recanati's (1995) 'domains of discourse' (cf. also Kratzer's 1981a 'conversational backgrounds', with which my own proposal is most closely related).

utterance):

May: p is compatible with the set of all propositions in domain D
(D-value → *unspecified*)

Can: p is compatible with the set of all propositions in domain D
(D-value → factual)

Must: p is entailed by the set of all propositions in domain D
(D-value → *unspecified*)

Should: p is entailed by the set of all propositions in domain D
(D-value → normative)

On this proposal, *may* and *must* turn out to be more 'general' than *can* and *should* respectively: *may* and *must* place no restrictions on the value of the domains of propositions which may serve as restrictors of the modal operator (the D-value is unspecified), whereas the semantically encoded content of *can* and *should* includes information to that effect. In the former pair of verbs, on-line processes of pragmatic comprehension fill in the empty slot in the semantics of the verbs; in the latter pair, a semantically specified restrictor offers a conceptual search-space, which can be further narrowed down pragmatically, if necessary. In this sense, *may* and *must* are examples of pragmatic saturation of an unspecified semantics, whereas *can* and *should* are cases of free pragmatic enrichment of an already complete, albeit vague, semantic content.

Before moving on, I would like to demonstrate that free enrichment and saturation represent two truly distinct and independently motivated semantic options, especially in the face of arguments to the contrary. In particular, it can be argued that saturation is not as straightforward a semantic possibility as free enrichment, insofar as the phenomena explained by saturation are also captured by two alternative analyses, related to it but definitely distinct. Adopting saturation analyses thus involves a tacit rejection of the other two alternatives, which should be argued for rather than simply asserted.

Let me use *must* to illustrate. Rather than assuming that the verb lacks a semantic value for the modal restrictor, we might assume either one of the following:

(a) The semantic representation of the verb includes a specification of a value for the restrictor in the form of a 'maximal' domain of propositions (D_{max}). The proposition embedded under *must* is taken to follow from the set of propositions in whatever domain satisfies logical consistency (i.e. includes no contradictions). This option lies behind all semantic accounts of *must* which analyse the verb in terms of absolute (or logical/alethic) necessity (cf. the 'Modal Fallacy' noted in Bradley and Swartz 1979: 331): on this view, the various types of necessity which *must* is capable of conveying in natural language are the products of pragmatic narrowing of the broad semantic content of the verb. This position, then, essentially reduces saturation to a version of free enrichment: I will call it the 'maximal restrictor' solution.

If generalised to quantificational devices in natural language, the 'maximal restrictor' solution would imply that maximal quantificational domains form the semantic default value for a number of expressions. Bach (1994a) explicitly takes this view with respect to another quantifier, *everyone*, when he notes that an utterance such as (26) literally (i.e. semantically) conveys (27) and only non-literally (28):[12]

(26) Everyone is going.
(27) Everyone in the universe is going.
(28) Everyone in the class is going.

(b) The semantic representation of the verb contains no slot for the restrictor. What *must* semantically conveys, on this view, is that the embedded proposition follows from the set of all propositions. This complete, albeit vague, semantic content is then pragmatically supplemented by an appropriate restrictor. On this second alternative, pragmatic saturation is again reanalysed as a version of free enrichment: I will call it the 'no restrictor' solution. Viewed in a broader light, the 'no restrictor' solution would imply that quantification in natural language is semantically unrestricted, thereby relying squarely on pragmatic processes to supply it with a

[12] There are differences between the type of quantification in *everyone* and a modal like *must*, of course: *everyone* contains a semantic restrictor to the effect that it ranges over domains of persons. Maximal domains now come as a further restriction of this initial domain. In *must*, a maximal domain of propositions is the only restrictor which (it is argued) appears in the semantic entry of the verb.

specific domain (of propositions, individuals, objects, events, and so on) to range over.[13]

There is some evidence indicating that neither version of the free enrichment thesis can adequately replace the saturation view for modals like *must*. Regarding the 'maximal restrictor' hypothesis, there are at least two reasons for suspecting that the decision to place a maximal restrictor in the semantic entry of *must* is associated with the long-standing concern of logicians and philosophers with absolute, alethic interpretation of modals; on linguistic grounds alone, such interpretations are just one possibility among the range of interpretations which the verb may contextually accept. In the first place, the 'maximal restrictor' view accepts as the encoded content of *must* something which will rarely be communicated. This introduces a considerable computational complication: the hearer is obliged to access, test and, in most cases, reject the 'literal', absolute interpretation of the modal before opting for free enrichment. In this way, he invariably has to go through something which is false in order to arrive at the proposition which the speaker intends the modal utterance to convey.

Moreover, this approach entails that alethic interpretations should have a facilitation effect on the comprehension of utterances containing *must*; quite to the contrary, it seems that such interpretations have a restricted distribution in natural language data (Karttunen 1972, Horn 1972, Lyons 1977, Palmer 1990). For instance, the most natural interpretation of (29) is paraphrasable not by (30) but by (31):[14]

(29) The criminal must be from this area.

(30) In view of everything that is logically possible, the criminal must be from this area.

[13] This view is argued against in Neale (1990), who also cites Quine (1940), Sellars (1954), Vendler (1967), Lewis (1973a), Cresswell (1973) and Grice (1981) as preferring saturation over a 'no restrictor' approach; cf. Westerståhl (1985).

[14] For similar reasons the 'maximal restrictor' solution is problematic even if it is construed in a weaker way, i.e. as a generalisation about pragmatic (rather than semantic) defaults for modals like *must*. In more general discussion of quantification, Roberts (1995) seems to be advocating this view: 'In examples where the relevant maximal domain is not plausible as the intended domain for an operator, if the operator has no explicit restrictive term, then felicity requires that there be some other salient and familiar domain restriction to satisfy the familiarity presupposition of the free variable R [the operator]' (ibid. p.692). I will have more to say about the pragmatic role of the maximal restrictor in modal environments in section 2.4.3.

(31) In view of everything that we know, the criminal must be from this area.

On the other hand, the 'null restrictor' solution, by recognising a complete, albeit minimal, semantic content for *must*, predicts that - in principle at least - there could be occasions on which the modal might express just this bare semantic content (i.e. an unspecified type of necessity). In support of this approach, one might point out that, according to some writers, it is possible to understand an utterance containing a modal verb without having to decide which kind of modality the utterance expresses: Coates' (1983) examples of indeterminacy are a case in point (see section 2.1.1). The difficulty with this view is that pragmatic indeterminacy is exhibited by all modals, not just those for which the 'no restrictor' solution can be proposed; more importantly, none of the types of indeterminacy usually recognised for modals is particularly suitable for representing 'no restrictor' semantics. Consider (32) - taken from Coates (1983: 145):

(32) The quality of the final product must be influenced by the quality of the raw material, and the methods of processing may influence its nutritional quality.

Since the two modals in (32) can receive either a root or an epistemic interpretation, the utterance is to some degree pragmatically indeterminate. There are two construals of the term 'indeterminacy' which have a bearing on the interpretation of (32). According to the first, indeterminacy arises simply because the utterance cannot be unequivocally interpreted in isolation; further contextual information, though, would make it possible to distinguish which interpretation was the one intended by the speaker. Since this is only superficially a case of indeterminacy, I will disregard it in what follows. On the second, more interesting construal, indeterminacy arises from the fact that both root and epistemic interpretations have (roughly) the same degree of accessibility for the hearer and are capable of causing a similar range of cognitive effects; hence, relevance considerations cannot adjudicate between them even in the presence of a fuller context. The question which now arises is: could this type of indeterminacy be viewed as a case where what is communicated is the bare (unenriched), 'no restrictor' modal meaning delivered by the semantics - which is

naturally going to be perceived as indeterminate between various candidate interpretations?

The answer has to be: no. Notice that the indeterminacy of the 'no restrictor' solution makes no reference to possible enrichments of the semantic content of the modals; the point of the example was precisely to come up with a case where the 'no restrictor' thesis would make a prediction which would be unique to that thesis, and therefore critical in the comparison between the 'no restrictor' and the saturation thesis. However, it seems that this absolute indeterminacy does not correspond exactly to the situation in (32): it is not so much that the utterance is indeterminate *tout court*, but rather that it is indeterminate between two alternative (but specific) ways of narrowing down the semantic content of the two modal verbs. In fact, I doubt that there can be any case where total indeterminacy exists in modal utterances. If I am right, then it is not the case that the 'no restrictor' solution is in a position to make predictions which the saturation view for modals cannot; moreover, it seems to make the wrong predictions by allowing for interpretations which never arise in a natural way.

To conclude: rather than symmetrifying the picture of the semantics of modals by reducing saturation to free enrichment, it seems that both options have to be maintained to deal with individual cases. In the next section, I demonstrate how different semantic inputs are pragmatically processed to yield the variety of interpretations of modal verbs.

2.3 Deriving root interpretations

2.3.1 Root interpretations of modals

Imagine that (33) is uttered by a bank employee to a young customer:

(33) Our branch may convert your account into a student account; you just need to supply us with proof of student status.

The utterance has the logical form in (33'):[15]

(33') It is compatible with the set of all propositions in domain D that $_p$[Our branch converts your account into a student account].

This logical form requires some fleshing out before it can be a truth-evaluable representation; in particular, it remains to be specified what is the value of the domain D, or what is the kind of propositions with which the proposition p is considered to be compatible. This domain will have to contribute to an interpretation of (33) which is accessible enough for the hearer, and capable of achieving adequate cognitive effects in a way compatible with the speaker's abilities and preferences (i.e. it should be an optimally relevant interpretation); furthermore, the resulting interpretation should be one that the speaker could reasonably have intended to be optimally relevant for the addressee.

Suppose that (33) was an answer to the customer's query about a change in the status of his account: in such a context, the customer has made mutually manifest that he is interested in changing the type of account he has, or that he considers such a change desirable from his own point of view. As a result, it already forms part of the two interlocutors' mutual cognitive environment that the change is compatible with the speaker's preferences. The only accessible enough domain of assumptions for which it would be relevant to know whether it is compatible with p involves the bank regulations. As a result, (33) is interpreted as informing the customer that the bank regulations permit the branch to convert his account into a student account.[16]

Similar considerations apply to examples (34) through (36):

(34) I'll tell you about your journey, so that you may make arrangements.

(35) To make this dish, any sort of pasta may be used.

(36) During the seminar, you may interrupt as often as is needed.

[15] In this and subsequent renderings of logical form I will omit details, such as the resolution of referential indeterminacy, etc.

[16] For purposes of the present discussion I disregard the fact that (33) may also receive an epistemic reading.

In (34), the domain of propositions with which the embedded proposition is compatible is a sub-domain of factual propositions describing the hearer's abilities and general circumstances concerning his journey; in (35) this domain is provided by a description of a recipe (a regulatory domain). In (36), the situation is a little more complex. Suppose that the utterance is produced by the person teaching the seminar to the class. Then it is mutually manifest to the interlocutors that students are theoretically in a position to interrupt as long as the teacher does not object. It follows that the only domain of propositions that could relevantly contribute to an interpretation of the modal verb in (37) is that concerning the teacher's own preferences. Given two further, mutually manifest contextual assumptions, namely that interrupting the seminar as often as is needed is desirable from the students' point of view, and that the teacher has some authority as far as the seminar is concerned, (36) will be felt to convey a 'permission' interpretation.

One might observe a common pattern in the way *may* contributes to the relevance of utterances in which it occurs. In all cases, the context includes an assumption to the effect that the embedded proposition p is incompatible with the set of all propositions in a certain domain D (or assumed to be so). What *may* does, then, is to contradict and eliminate this contextual assumption, by conveying that p *is* compatible with the propositions in D - or, to put it differently, that the negation of p (~p) does not follow from the set of propositions in D. This explains how utterances containing *may* are capable of achieving any cognitive effects at all, given that their communicated content (according to which a proposition is compatible with a certain set of other propositions) makes for a very weak statement.

Indeed, a Gricean analysis would characterise utterances containing *may* as informationally impoverished, on a par with other constructions such as negative utterances (Karttunen 1972; for a neo-Gricean account of negation, see Horn 1989). The parallel is to be expected: if we consider compatibility as an implicitly negative term,[17] the case of *may* falls squarely within the province of negative operators. As is generally noted, utterances containing a negation marker can be felicitously used only

[17] The term 'implicit negative' belongs to Fodor, Fodor and Garrett (1975), and refers to terms whose underlying semantic representation includes a negative term. Their examples (*deny, doubt*) differ from *may* in that their syntactic behaviour parallels that of explicit negatives (e.g. they trigger negative polarity items).

in special contexts: in discussing Pierre's news, for instance, it would be awkward to assert (37) in the absence of a contextual assumption to the effect that (it is expected that), after his divorce, Pierre will visit his daughter very often. Similarly for *may*, it would be awkward to assert (38) in the absence of a contextual assumption to the effect that (it is expected that) his divorce will prevent Pierre from visiting his daughter very often:

(37) After his divorce, Pierre will not visit his daughter very often.

(38) After his divorce, Pierre may visit his daughter very often.

What this fact about negation suggests, according to a number of psychologists and linguists (Wason 1965, Greene and Wason 1970, Givón 1978, Horn 1989), is that, on their commonest and most natural interpretations, negative statements are understood as denials. In this sense, negatives (and, by extension, *may*-utterances) in some pragmatic sense 'presuppose' the existence in the immediately accessible context of their affirmative counterparts.

In relevance-theoretic terms, the weak informativity of *may*-utterances and other structures can be redefined as non-productivity of contextual implications: in (37)-(38), the explicatures of the utterances are unlikely to interact with any existing contextual assumptions to yield contextual implications. Given that they are also unlikely to strengthen any existing contextual assumptions, it follows that the only way open to them for achieving relevance is by contradicting and eliminating an assumption previously held in context. This typical path in the interpretation of root *may* is precisely what my analysis in the previous paragraphs has suggested. Naturally, as an aspect of pragmatic processing, the 'contradiction and elimination' interpretation of *may* is contextually defeasible: there is nothing in a relevance-theoretic account to prevent the explicature of an utterance such as (38) from interacting with a contextual assumption such as (39) to yield a contextual implication such as (40):

(39) If, after the divorce, Pierre may visit his daughter very often, his ex-wife will be very upset.

(40) Pierre's ex-wife will be very upset.

It appears that, while unique to relevance theory, the proposed account of *may* is capable of capturing intuitions discussed in other accounts. This conclusion is reinforced by the observation that there is now an available pragmatic explanation for Sweetser's (1990) idea that *may* encodes the existence of a potential but absent barrier. What the 'barrier' idea taps is that, although the proposition p which is embedded under *may* was (or could be) previously contextually expected to be incompatible with the assumptions in the relevant propositional domain, this is not in fact the case.

I now want to turn to uses of *can*. Consider (41):

(41) Computer-based instruction can co-occur with more traditional methods of teaching.

The logical form of the utterance is given in (41'):

(41') It is compatible with the set of all propositions in the factual domain that $_{p}$[Computer-based instruction co-occurs with more traditional methods of teaching].

According to my above suggestions about the encoded content of *can*, the verb semantically specifies as its restrictor the domain of factual propositions. This is the reason for the commonly held view that *can* encodes 'potentiality' (Walton 1988, Bolinger 1989, Klinge 1993): a state of affairs is characterised as potential when it is compatible with the states of affairs in the actual world, and hence may itself be actualised at some point in the future. Further, the semantics of *can* may be contextually enriched to the point of isolating a certain sub-domain of factual assumptions which is intended to be the modal restrictor; this is illustrated by the possible paraphrases of (41) given below:

(42) a. In view of the way schools are run these days,

b. In view of the technical equipment available nationwide,

c. In view of the teachers' encouraging stance,

d. In view of the new guidelines from the Ministry of Education,

computer-based instruction can co-occur with more traditional forms of teaching.[18]

What about the 'ability' reading of *can*? A number of writers have argued that this is a non-modal use which corresponds to the basic meaning of the verb (see, e.g., Foolen 1992). I will take the view that the 'ability' interpretations of *can* are as much the result of enrichment of the semantic content of the verb as the various 'potentiality' interpretations of (42). Consider the pair of examples in (8), repeated below as (43a-b):

(43) a. Mary can speak German.

b. Mary can speak German at the meeting, because everybody is going to understand her.

In its most natural interpretation, the utterance in (43a) will be taken to communicate something about Mary: the hearer will retrieve (or construct on-line) the encyclopedic entry for Mary and process the embedded proposition $_{p}$[Mary speaks German] against assumptions that have become available through the activation of this encyclopedic entry. In other words, the state of affairs described in p is taken to involve a property of Mary's which is compatible with her other features. This way of narrowing down the factual domain of propositions in (43a) differs from (43b), where the state of affairs described by p is an instantiation of the general fact that Mary speaks German: in order to compute whether p is compatible with the relevant set of propositions in the factual domain, we now need to take into account a broader sub-domain of factual propositions apart from those involving Mary's internal properties - for instance, assumptions concerning the

[18] (42d) might be thought to involve a 'regulatory' rather than a factual domain; however, it seems to me that the guidelines of the Ministry of Education contribute to the interpretation of (41) as if they represent established facts about the world - a sort of regularity of facts. This is a good candidate for domain overlap, as described in section 2.2.2.

situation in meetings, the other participants, and so on. Therefore, we cannot get a pure 'ability' reading for (43b) as we can for (43a).

I suggest, then, that ability interpretations for *can* arise whenever the sub-domain of factual assumptions which is taken to be compatible with the embedded proposition belongs to the 'file' for an individual or object (which also normally appears as the sentential subject). This analysis predicts that, whenever both individual-specific and broader factual considerations bear on the comprehension of *can*, the traditional ability/potentiality distinction will collapse - this is exactly what happens in (43b). By resisting proposals to place 'ability' concepts within the semantics of *can*, this account also manages to avoid a host of problems which these proposals face. For instance, inanimate subjects and passive sentences, which provide counterexamples to an ability-based semantics for *can*, are naturally predicted to favour a 'root potentiality' interpretation on my account: there is no individual or object to furnish a fact-supporting conceptual (:encyclopedic) entry, with which the new attribute would be judged compatible:

(44) a. Bad weather can ruin the crops.

b. The total sum can be divided into two equal parts.

Finally, the present account offers a satisfactory explanation of the relation between *can* and *be able to*; the latter is taken to encode ability, as shown in the following contrasts:

(45) a. John can/?is able to swim, if he likes.

b. We can/?are able to offer you a discount, if you wish.

Unlike what the conditionals convey, inherent ability cannot be subject to an individual's wishes - John's in (45a) or the addressee's in (45b); this incongruity is the reason for the unacceptability of the utterances containing *be able to*. Utterances containing *can*, on the other hand, do not give rise to similar problems since ability is not present in the semantic content of the verb.

Next, I want to comment briefly on uses of *can* to convey a suggestion or an offer. This type of interpretation requires the presence of the following collection of contextual assumptions: (i) the embedded proposition p represents a state of affairs which is

manifestly desirable to the hearer from his own point of view, as well as beneficial to him; (ii) the speaker has the responsibility for bringing about the state of affairs described in p; and (iii) the speaker manifestly lacks any obligation to bring about this state of affairs:

(46) a. We can meet one day after work.
b. I can give you a lift.

Finally, *can*, like *may*, is used 'deontically' to communicate permission. The differences between the two verbs are brought out in (47):

(47) a. You can smoke in this room.
b. You may smoke in this room.

Suppose that the following contextual assumptions are mutually manifest to the speaker (Monica) and hearer (Patrick): (a) the state of affairs in which Patrick smokes in the room is considered desirable from his own point of view; (b) it is within Patrick's power to bring about this state of affairs; (c) Monica has some sort of authority over Patrick. By using (47a), Monica informs Patrick that there is nothing in the factual domain which blocks his smoking in the room. In other words, circumstances are such that he is allowed to smoke. By contrast, (47b) can be used to communicate that Patrick's smoking in the room is compatible with a variety of assumptions; for instance, if the context included an additional assumption to the effect that Monica's preferences could disallow Patrick's smoking, then it would follow that in (47b) the modal restrictor for *may* would include (apart from factual assumptions) the speaker's preferences. This is the reason for generally considering *may* a more polite form for giving permission than *can* (since it conveys, in a sense, greater speaker involvement).

This is not to say that *may* is always felt to be polite. Imagine that (48) is uttered by a general after interrupting a soldier who is talking: the soldier will feel under greater obligation to go than if he had simply received permission:[19]

[19] Such examples have been treated in the literature as cases of 'pragmatic strengthening' which form part of 'context-induced reinterpretation' within a grammaticalisation chain (Heine 1995).

(48) You may go home, Jones.

Here, the context lacks the assumption that Jones considers going home as desirable from his point of view (I will call this assumption z); actually, the fact that Jones was in the middle of talking rather makes mutually manifest the opposite assumption (i.e. that he does not wish to leave immediately). However, it is difficult to see how the general could have intended (48) to be optimally relevant to Jones, unless the general believed that z is true. So Jones has to supply z as a background assumption and attribute it to the speaker (even though he knows z is false). The interpretation would proceed along much the same lines as (47a) above, except that Jones knows that the general knows that z is false: the general makes as if z were a mutually manifest contextual assumption. The intuition that, under these circumstances, the utterance is rude, results from the fact that the general ignores the hearer's preferences, although these are contextually salient. A similar analysis can be given for the following examples with *can*:

(49) a. You can forget about your Christmas present - you haven't been a good boy.

b. You can start looking for a new job.

The pragmatics of *must* can be dealt with quite straightforwardly in the above framework. Imagine that Mary finds herself in a very cold room and utters (50):

(50) I must sneeze.

The logical form of the utterance is provided in (50'):

(50') It is entailed by the set of all propositions in domain D that $_{p}$[Mary sneezes].

What the hearer is expected to retrieve is that Mary's sneezing is a necessary outcome given her physical condition and the circumstances in the room. This entails that the unspecified domain D in (50') has to be pragmatically narrowed down to a sub-set of

factual propositions. Other types of contextual enrichment of the semantic content of *must* are given in (51):

(51) a. In opening a game of chess, the players must move a pawn.
b. The President must formally approve the new Goverment before it can undertake its duties.
c. The accused must remain silent throughout the trial.

These three utterances require regulatory domains of different types: (51a) expresses a necessity with respect to the rules of chess, (51b) a necessity with respect to the Constitution and (51c) a necessity with respect to judicial rules.

Must admits a variety of propositional domains as restrictors. (52) is a slightly more complex example:

(52) I must lose weight.

Assume that the speaker, Amy, wants to become attractive and realises that the only way to achieve this is by losing weight. It follows that losing weight is necessary in view of Amy's desire to become attractive (and the factual assumption that, unless she loses weight, she will not do so). (52), then, is the product of (one version of) what philosophers have called *practical syllogism*, i.e. a kind of syllogism which is not concerned with belief-formation and persuasion but with intention-formation and action (von Wright 1963; cf. Anscombe 1957, Harman 1976, Kratzer 1981a, 1991); practical syllogism has the following general form:

(53) a. I want to attain y.
b. Unless z is done, y will not be attained.
Therefore, z must be done.

Applied to (52), (53) yields:

(54) a. Amy wants to become attractive.

b. Unless she loses weight, Amy will not become attractive.
Therefore, Amy must lose weight.

or, more formally, (55):

(55) a. $_{q}$[Amy becomes attractive], where $q \in D_1$ (D_1 = domain of propositions describing what is desirable from Amy's point of view).

b. $_{z}\{_{p}$[Amy loses weight] $v \sim _{q}$[Amy becomes attractive]$\}$, where $z \in D_2$ (D_2 = domain of factual propositions).

c. Therefore, p must be true in D_3, where $D_3 = D_1 \cup D_2$.[20]

What (55) captures is that, for Amy, losing weight is a necessary means to a desirable end; this type of necessity is commonly conveyed by *must*. This account fares better, I think, than previous approaches to deontic *must*; for instance, Groefsema (1995) has proposed that the proposition expressed by utterances such as (52) becomes enriched to the point that it represents a desirable state of affairs. (52), on her analysis, comes out as having the following enriched propositional form (assuming my semantics for the modal):

(56) Amy desires that $_{k}\{_{p}$[Amy loses weight] is entailed by the set of all propositions in domain D$\}$.

As I have already pointed out, however, (56) does not correspond to an intelligible desire; moreover, what Amy desires is effectively not the state of affairs described by k but a different one - that she becomes attractive - for which losing weight is a prerequisite (see section 2.1.3.2). On my account, what the speaker considers as desirable will not be directly retrieved from the surface structure of the utterance in (52) but will be contextually supplied by the hearer.

There is only a short distance from the type of interpretation in (52) to the purely deontic (i.e. obligation-imposing) uses of *must* in (57):

(57) a. You must write 100 times 'I will never yawn in class again'.

[20] Talking of union of sets is a simplification; see section 2.3.2 for discussion.

b. You must love your fellow humans.

The deontic interpretation of (57a) arises in case (i) the modal restrictor involves a set based on the speaker's desires and factual assumptions (or, alternatively, a set of regulatory propositions which the speaker is entitled to enforce); (ii) the speaker has authority over the hearer; (iii) the hearer is in a position to bring about the state of affairs described in the embedded proposition. An interesting variant of the 'obligation' interpretation arises in cases of imperative suggestions/offers (cf. section 2.1):

(58) a. We must go for a drink one day.
b. I absolutely must walk home with you.
c. You must come and visit us sometime.

Consider in particular (58a): the utterance conveys that it is entailed by (the relevant sub-set of) the speaker's desires that she and the addressee go for a drink one day. Since the addressee most probably has to show sensitivity to her interlocutor's desires due to the social rules governing their relations, the utterance will be interpreted as an urgent form of suggestion (for the contextual background against which 'suggestion' readings typically arise, see the discussion of (46) above).

I come, finally, to *should*. The verb is often felt to convey obligation of a weaker type than *must* in examples like the following:

(59) You should hoover the place once in a while.
(59') It is entailed by the set of all propositions in the normative domain that $_{p}$[You hoover the place once in a while].

According to its semantically specified restrictor, *should* expresses a necessity relative to existing stereotypes, norms or expectations. The comprehension of *should* relies quite heavily on the sort of structured knowledge humans typically possess about the normal course of events, which has been referred to by various writers in cognitive psychology as 'scripts', 'frames', 'scenarios', and so on (see 1.2.1). To the extent that norms, apart from being statistical generalisations, acquire regulatory status as well,

root interpretations of *should* become indistinguishable from those of *must*. Still, since what is expected/normal can be quite different from what is commanded, *should* is generally seen as communicating a less urgent kind of necessity than *must*.[21]

From that point of view, the verb bears certain similarities to *ought to*, which, I want to suggest, semantically specifies as its modal restrictor the domain of ideal/ morally recommended states of affairs:

(60) One ought to respect one's country.

(60') It is entailed by the set of all propositions in the domain of ideals that $_{p}$[One respects one's country].

(61) - (62) illustrate the differences between the types of necessity communicated by *must*, *should*, and *ought to*:

(61) In this game, you must/?should/??ought to carry an egg in a spoon and be careful not to drop it.

(62) Chief scout to the younger boys:

a. You must be back by midnight, ?although it's fine by me if you aren't.

b. You should be back by midnight, (?) although it's fine by me if you aren't.

[21] I assume, with a number of researchers in the field (see Warner 1993), that *should* is not synchronically perceived as the past tense form of *shall* but has entered the modal system as a separate, individual item. Still, there are a number of uses of the verb which are considered to retain overtones from its original meaning, or to be generally unrelated to the rest of its root interpetations (Ehrman 1966, Coates 1983, Palmer 1990); for instance, *should* is used in ways similar to hypothetical *would* as in (i), as a hypothetical marker with inverted word-order as in (ii), or with a seemingly null contribution to meaning (i.e. as a place-holder) in the quasi-subjunctive construction in (iii):

(i) I should be grateful if you could bear my case in mind.
(ii) Should you require any further assistance, please feel free to contact us.
(iii) I do not desire that I should be left alone in this task.

These examples involve hypothetical environments with varying degrees of complexity. Some might be dealt with rather straightforwardly within the existing framework; the first one, for instance, requires us to add an extra condition to the 'expectation' restrictor of *should*, namely the antecedent of the conditional. What (i) conveys is paraphrasable thus: 'given my expectations and the fact that you could bear my case in mind, it follows that I am grateful'. The other examples represent more idiosyncratic aspects of the English modal system, which probably have to be learnt individually: this is especially true for (ii), where the use of *should* correlates with a distinct syntactic configuration peculiar to auxiliaries (which is parasitic on the semantics of the conditional).

c. You ought to be back by midnight, although it's fine by me if you aren't.

In (61), since *must* lacks any semantic conditions on the restrictor, it is open to an interpretation where the rules of the game function as the restricting domain. The utterance with *should* is slightly worse: although the rules of the game can do duty as a normative domain, this particular game is far removed from what is a typical game activity (compare: *In this game, you should try to reach the end faster than your opponent*). Finally, *ought to* in (61) is distinctly odd, since the domain semantically provided for the interpretation of the verb clashes with the pragmatic requirements on the comprehension of the utterance.

In (62), the differences in acceptability also bear on the selection of the restrictor: (62a), on its most accessible interpretation, is construed as imposing an obligation on the younger scouts (given a number of contextual assumptions concerning authority and social relations in the group); the continuation of the utterance therefore becomes unacceptable. (62b), although it can receive a similar interpretation, is also open to another reading: the chief scout simply reports what is entailed by the norms/expectations concerning a scout's behaviour, but is manifestly not in agreement with those norms, so that he will not use his authority to enforce them. Finally, (62c) is a mere statement concerning what ideals or duty entail, which can differ substantially from what the speaker is prepared to accept in practice.

The detailed discussion of the root meanings of modals in this section has shown that the divergence of contextual interpretations can be adequately predicted by a simplified semantics plus a richly articulated and powerful pragmatic machinery. What emerges as a clear conclusion is that classic modal categories such as 'deontic' or 'simple root/dynamic' are not well-defined and clear-cut, but can be traced along a continuum depending on specific contextual assumptions about the social relations between the interlocutors.

2.3.2 Selecting/constructing modal restrictors

In the previous paragraphs, I have argued that modals are context-dependent

expressions, in that they depend on inferential pragmatic enrichment processes to complement the information they semantically encode. Depending on the type of enrichment they permit, modal verbs are understood as communicating different kinds of modal meanings. The process of pragmatic enrichment dovetails with relevance considerations, which supply the intended restricting domains for modals. My purpose in this section is to comment more extensively on the selection and construction of modal restrictors and deal with a number of objections which could be raised to my analysis of root modality.

A first potential objection could be formulated as follows:

> Your account has so far remained silent on the precise mechanism of domain-selection for modals. This, however, is no trivial task: the question of which domain of assumptions to select as the background for modality bears directly on the issue of what to consider as 'relevant evidence' for a proposition (in the pretheoretical sense of 'relevant') - a thorny question which has occupied much research in philosophy, psychology and artificial intelligence (cf. the discussion of the 'frame problem' in Fodor 1983, Pylyshyn 1987). Your solution to this problem will be crucial, especially for some modals for which you have assumed a very weak semantics. Consider *may*: anything can be said to be compatible with the set of propositions in some domain or other. For instance, the proposition that I become Mayor of Paris is compatible with the laws of arithmetic: what is there in your account to stop me from uttering *I may become Mayor of Paris* with the laws of arithmetic in mind?

Such an objection confuses two issues which need to be disentangled: one has to do with the general epistemological problem of deciding what type/domain of assumptions a proposition relies on for its confirmation or disconfirmation; the other has to do with the psychological problem of deciding what could be the intended domain for a proposition embedded under a modal verb. The epistemological problem, which is indeed one version of the famous frame problem, arguably has little bearing on the second, cognitive problem, which is the one involved in producing and understanding modal expressions in natural language. Instead of surveying the range of possible domains which might be used for evaluating the embedded proposition, and thus getting entangled in the complexities of the frame problem, a relevance-oriented organism such as the human cognitive system will obey specific constraints in considering evidence for/against a proposition; potential domains will therefore

include assumptions which are easily accessible from the encyclopedic entries of the concepts in the embedded proposition and other assumptions which have become contextually available (see Sperber and Wilson 1996 on how relevance considerations of effort-effect balance explain one (intelligible) version of the frame problem). Moreover, we are concerned not simply with an isolated assessment of possibility or necessity, but with a modal *utterance*; communication raises specific expectations of relevance, so that the speaker can only expect the hearer to arrive at the type of evidence she has in mind, if that evidence is recoverable on the basis of general assumptions about causality and law-like generalisations. In our example, the main reason for using a possibility statement with *may* is to reject a previous assumption, according to which the proposition embedded under *may* described an impossible state of affairs; for instance, the utterance *I may become Mayor of Paris* encourages the hearer to concentrate on that set of evidence which was previously assumed to exclude my becoming Mayor of Paris, and invites him to reconsider it.

Talk of domains should not mislead one into thinking that the recovered modal restrictor invariably feeds into the proposition expressed by the modal utterance in the form of a set of 'background' propositions. As the discussion of root modality has suggested, I hold that the specification of the intended domain takes the form of a general description ('factual', 'ideal', etc.), which is normally pragmatically inserted in the proposition expressed in order for the logical form of a modal utterance to become truth-evaluable. I think that at least such a broad description of the intended modal restrictor (i.e. of the intended type of modality) is necessary for the comprehension of a modal utterance. There may be cases where the same range of assumptions is captured by more than one domain (e.g. the epistemic and root domains), and so there are two possible interpretations of the utterance; such extensionally equivalent domains are bound to be equally accessible and to have equivalent cognitive effects. In those cases, the interpretation of the utterance will oscillate between the two domains, without having to be resolved in favour of one or the other. Examples in point are cases which have been called 'merger' (Coates 1983) - below I repeat the earlier example (32) as (63):

(63) The quality of the final product must be influenced by the quality of the raw material, and the methods of processing may influence its nutritional quality.

Still, one might insist that my formulation of domain-selection does not adequately characterise how modal restrictors are formed. A second objection might go like this:

> Compared to previous accounts such as Kratzer's, your account is considerably impoverished in this sense: Kratzer dealt with the problem of domain-selection by adopting two types of modal domain, a modal base and an ordering source, either of which could be empty, and whose interaction produced a variety of modal interpretations. In your own analysis, you do not distinguish between different kinds/sources of modal restrictors. Nevertheless, you seem to be tacitly assuming such a duality of restrictors at a number of points; namely, when you invoke mixed domains or a union of two different domains as you do in example (52). Aren't you glossing over important pragmatic (if not semantic, as Kratzer assumes) aspects of the formation of domains here? Could that be evidence that the notion of domain is not appropriate or sufficient to restrict modal semantics after all?

In responding to this objection, I would like to repeat that the concept of 'domains of propositions' is not meant to suggest that domains are somehow clear-cut, 'natural' clusters of mutually dependent propositions. Apart from some crude distinctions, which correspond to different storage and processing spaces in the language of thought (ideals, stereotypes, laws of nature, etc.), there is no easy way of distinguishing whether we are dealing with one domain or a union of domains. The interesting cases where there are clear intuitions about 'mixed' domains arise in examples like (52), repeated for convenience:

(64) I must lose weight.

The utterance expresses a necessity in view of what the speaker considers desirable from her point of view (:that she becomes attractive), given certain circumstances. Now in similar cases of practical syllogism, the idea behind a 'mixed' domain (or a modal base plus an ordering source) is this: the domain of desirable states of affairs is only incompletely specified. We therefore assume that it is identical to the factual domain, apart from specific states of affairs which are altered. So when I said that

utterances like (64) involve a mixed modal domain, I was in fact being quite specific as to the content of that domain; using a different terminology, I might have said that only one domain, that of the speaker's desires, is involved - and leave it to pragmatic inferencing to construct this domain (mainly) out of factual assumptions.

Earlier on, in criticising the Lewis-Kratzer notion of similarity among worlds, I suggested that the similarity of representations of alternative realities to the representation of actual/normal states of affairs can be explained on cognitive grounds. I now want to expand a little on reasons why domains other than the factual one rely heavily for their structure on factual information (see also Papafragou 1996a). The reasons, I suggest, relate to two-fold considerations of relevance: amount of (expected) cognitive effects as well as economy of processing effort. On the effects side, given the strong cognitive gains from handling factual assumptions, a rational being would have no reason to entertain alternative possibilities if they had absolutely nothing to do with the way the world actually is. In most cases, in order to achieve relevance, representations of a given domain should be descriptions of a state of affairs not simply possible but also potential, that is, close enough to the actual one to able to be, become or have been actual itself.

On the effort side, it makes sense to keep representations of alternative states of affairs similar to our representation of actuality. There are obviously quantitative and qualitative aspects to similarity. On the one hand, the individual representations have to share a number of propositions; on the other, the sort of proposition they share has to be important, or non-trivial. To be sure, thoughts about alternative states of affairs may depart quite radically from our mental representations of reality. However, every departure from the current construal of the world demands considerable cognitive effort, and therefore has to be offset by adequate cognitive effects: what these effects consist of is a different picture of what the *actual* world could be (become/have been), if a set of conditions (e.g. moral rules, obligations, etc.) had been met. Therefore, the most economical way of setting up representations of alternative realities is to introduce a set of separate assumptions (ideal, stereotype-based, or other) into a body of assumptions about the real world which is held maximally constant. Moreover, apart from the cognitive side, there is a communicative side to this issue. When inviting the hearer to entertain a representation of an alternative state of affairs, and see what follows from it, the speaker should be careful to convey a

representation which the hearer can reconstruct from the evidence he possesses, that is, from his own representation of actuality. Since the actual world is (by definition) the only world which is realised, it is going to be the one which furnishes a vast range of assumptions mutually manifest to the interlocutors; it would be communicatively infelicitous (Grice would say 'un-cooperative') to introduce alternative states of affairs which depart from these mutually manifest assumptions for no good reason and in unpredictable ways.

The problem of deciding how much of the structure of the actual world to preserve when constructing alternative possibilities has been much discussed in philosophy and linguistics. As Stalnaker puts it, 'some opinions acquire a healthy immunity to contrary evidence and become the core of our conceptual system, while others remain near the surface, vulnerable to slight shifts in the phenomena' (Stalnaker 1970: 126). The former correspond to assumptions we are unwilling to part with when constructing alternative states of affairs - for instance, laws of nature, or particularly compelling empirical facts; the latter correspond to contingent details, which, if they were otherwise, would not seriously influence the picture we have about the world as it is. I will not pursue the issue any further but merely take for granted that some of our ideas about the world are cognitively and metaphysically more central, and therefore unlikely (because of processing cost) to be revised or abandoned when we set up plausible alternatives to actuality.[22]

I have assumed that the construction of alternative domains proceeds essentially as a union between sets of factual and non-factual assumptions; most probably, the interaction of the two types of sets will bring about modifications, since assumptions standardly come in smaller networks of locally dependent assumptions. Take a situation in which I have two sisters instead of one. This situation will not differ from the actual one only in terms of a single state of affairs described by the proposition p 'I have two sisters': it will also differ in terms of a range of propositions which would also be true once p was true (such as 'My family has five members', or 'There are four females in my family'). This is because whatever aspect of the world makes p true also makes the rest of these propositions true. This relation between propositions (called 'lumping' by Kratzer 1989) is obviously very important in specifying the exact content of alternative

[22] For more detailed discussion of the philosophical issues involved here, see Stalnaker (1968), (1970), (1980), Goodman (1955), Lewis (1973a).

domains. However, when it comes to the psychological representation of possibilities, not all propositions lumped by a novel proposition will be computed and added to the representation of alternative realities (i.e. to non-factual domains). Considerations of processing effort will ensure that only aspects which may yield cognitive gains will be explicitly represented and processed. These cognitive gains do not include, for instance, the trivial implications of p I mentioned; rather they include implications which are capable of entering into further inferential processes and yield cognitive effects (e.g. 'I get less money from my parents', 'I share my room with two people', and so on). To the extent that dropping, adding or modifying assumptions about the actual world does not have any immediate relevance, we can safely suppose that it is left undone. As I have already hinted, when constructing a non-factual domain, we manipulate that part of it which is cognitively rich and assume the (unspecified) rest to resemble the factual domain, even though we recognise upon reflection that this is not strictly speaking correct.

On this view, Kratzer's ordering source on modal bases - together with the requirement to respect normalcy standards in constructing alternative worlds - fall out from more general cognitive considerations. Furthermore, this account escapes the risk of creating logically inconsistent 'mixed domains', e.g. through arbitrarily carrying over factual assumptions into desirability domains (since what we consider desirable may clash with the facts). Cognitive economy prevents a fuller conceptualisation of an alternative world than strictly necessary; still, to the extent that we need to represent an alternative state of affairs, we adjust the content of the new domain so that only the most accessible and better evidenced factual assumptions will be retained and combined with desires, obligations, ideals, and so on during the contruction of non-factual domains.

It is often the case that, during a single conversational exchange, modal domains are shifted and modified. Imagine that Alice and her lawyer have been discussing the possibility of Alice's having a divorce; Alice utters (65) and her lawyer replies as in (66):

(65) I can't leave my husband penniless.

(66) Of course you can - the law allows you to.

It is clear that the modal restrictor in (65) includes assumptions about Alice's feelings and moral strength, whereas in (66) it includes assumptions about legal regulations. The shift in the value of the restrictor is an instance of accommodation (Lewis 1979), where there is a change in the boundary of the relevant domains for modality. The capacity to perform appropriate shifts in the modal restrictors here is on a par with the more general ability to pragmatically infer the intended domain for a modal operator by monitoring cost-effect expectations which the speaker has built into the modal utterance.

2.4 DERIVING EPISTEMIC INTERPRETATIONS

2.4.1 The metarepresentation hypothesis

Throughout the previous discussion I have assumed that modality operators encode a logical relation between a proposition and a set of other, contextually specified propositions. I now want to claim that what sets epistemic modality apart from the kinds of modality examined so far is that the proposition embedded under the modal here is a metarepresentation.

Let me start with some preliminary definitions, which I have already alluded to in section 2.2.2. According to relevance theory (Sperber and Wilson 1986/1995, Wilson and Sperber 1988b), any representation of propositional form can be used in two ways: either descriptively, where the representation is used as a truth-conditional description of external circumstances, or interpretively, in which case the representation represents another representation with a propositional form which it resembles in content (i.e. with which it shares logical and contextual implications). This dichotomy corresponds to another distinction which is sometimes made between two sorts of propositional attitude (Wilson 1993; cf. Sperber 1994a, 1994b, 1996, 1997). Descriptive attitudes are attitudes towards propositions which are regarded as truth-conditional representations of states of affairs: for instance, fearing, demanding or regretting are cases of descriptive attitudes. Interpretive attitudes, on the other hand, are attitudes towards propositions *qua* propositions, i.e. abstract representations which can be entertained as elements of thinking episodes in an agent's mental life: doubting, proposing or wondering are examples of

interpretive attitudes. Depending on their semantic content, propositional-attitude and other predicates pick out a specific use of the propositions under their scope. This becomes evident in the two possible uses of the *that*-clause in (67)-(68):

(67) That the cabinet is corrupt is very sad.

(68) That the cabinet is corrupt is completely unfounded.

In (67) *that* introduces an assumption which is put forth as a description of an actual state of affairs; it is this state of affairs that the speaker describes as very sad. In (68), however, *that* introduces an assumption which is put forth as a representation of an abstract hypothesis, possibly entertained by some people with various degrees of endorsement; the attitude of the speaker focuses on the abstract hypothesis (rather than the state of affairs represented by it).

The interpretive use of representations couched in propositional form rests on our ability to entertain and manipulate second-order representations in the language of thought. This ability may, in fact, consist of separate specialised systems of metarepresentation; one possibility would be to recognise three such sub-systems, each dealing with a separate sub-type of interpretive use: a metacommunicative, a metalogical and a metacognitive one.[23] The metacommunicative system would handle representations of utterances, i.e. linguistically communicated propositional forms, originally produced by the speaker at a different time or by another source. The metalogical system would be responsible for checking representations for logical consistency, detecting contradictions, and (in more advanced forms) judging a line of argument as valid or undecidable, reasoning about hypothetical possibilities, employing reductio ad absurdum and, generally, generating possibilities that have not been specified in advance (cf. Moshman 1990, Sophian and Somerville 1988, Byrnes and Overton 1986). As for the metacognitive system, it would deal with representations of mental states, such as beliefs and desires, and with the human capacity for reflecting on mental states, either one's own or the projected mental states of someone else.

[23] Sperber (1997) has made proposals along these lines.

Being varieties of interpretive use, the metacommunicative, metalogical and metacognitive operations share the property of dealing with representations of propositional content, rather than form. It is conceivable that there is a different sub-system for the metarepresentation of linguistic form (covering, for instance, examples of linguistic mention); I will come back to this in chapter 3. For my immediate purposes, I will concentrate on the workings of metacognition.

The metacognitive capacity has in recent years been associated with the so-called *theory of mind* hypothesis in psychology and the philosophy of mind (cf. the contributions in Carruthers and Smith 1996, and chapter 4). This hypothesis entails precisely that part of the human cognitive mechanism is the ability to know one's own mind as such, i.e. to reflect on one's mental contents and processes and to accommodate the results in a coherent picture of the mental world (see Wellman 1990, Gopnik 1993, Leslie 1995). The theory of mind is based on specific ontological commitments, and is itself part of human ontological knowledge; moreover, it gives a causal-explanatory framework to account for/predict phenomena in the mental domain (for different views on the domain-specificity of the theory of mind, see Gopnik and Wellman 1994, Leslie 1994).[24]

I now come to the heart of my proposal: There is an obvious sense in which expressions of epistemic modality fit into a representational model of the mind: in their epistemic uses, modals like *may, must, should,* and *ought to* communicate - broadly speaking - a logical relation between a certain proposition and the speaker's belief-set. The employment of epistemic modality rests crucially on the ability to reflect on the content of one's own beliefs, to take into account the reliability of those beliefs (i.e. the relative strength with which they are entertained),[25] and to perform deductive operations on them. The above processes jointly presuppose the ability to conceive of one's mental contents as representations distinct from reality which may bear a variable degree of correspondence to the actual world.

[24] Not everybody would agree about the nature of theory-of-mind abilities; even the authors I have cited disagree among themselves. I will not take a position with respect to the various alternative positions here (see also chapter 4).

[25] *Strength* is defined as the cognitive counterpart of the philosophical notion of subjective probability: i.e. a non-representational property which captures the degree of confirmation/support assigned to any given stored assumption and is determined by the assumption's initial formation and subsequent involvement in various cognitive processes; I here follow Sperber and Wilson (1986/1995: 76ff.).

On this picture, epistemic interpretations of modal verbs involve a propositional representation being used interpretively: the complement of the verb (:the embedded proposition) is not used as a truth-conditional representation of a state of affairs in the external world but as a representation of an abstract hypothesis, which is considered to be compatible with/entailed by the speaker's set of beliefs. This is the reason why epistemic interpretations are typically taken to convey how much evidence the speaker possesses for the embedded proposition. This type of modal interpretation contrasts with root modal interpretations, where modality operates over propositions handled as truth-conditional descriptions of states of affairs (in the present, or in an alternative - ideal, stereotypical, etc. - world). Epistemic operators take scope over propositions which are consciously entertained and manipulated *qua* propositions by the speaker. To put it differently, the proposition embedded under an epistemically understood modal is not to be treated as directly picking out a state of affairs in the world, but as describing what Sweetser (1990) has called an 'epistemic object'.

If correct, the metarepresentation hypothesis about epistemic modality will afford a number of predictions about the truth-conditional behaviour of epistemic modal interpretations, their contribution to relevance, and their acquisitional peculiarities. I will comment on these aspects of epistemic modality later on in the thesis. In the remainder of this chapter, I will illustrate how the metarepresentation hypothesis fits with the account of modality already developed for root interpretations in the previous sections.

As a last point before moving on, I wish to remove a possible objection to the metarepresentational account which might arise at this stage. Isn't it the case, one might ask, that virtually all assertions are backed up to various degrees by the speaker's belief-set, and can thus be considered as conclusions based on internally represented evidence? This is, after all, what underlies Grice's second maxim of Quality: 'Do not say that for which you lack adequate evidence' (Grice 1975: 67). Does this mean that we should mark all regular assertions as cases of interpretive use? Obviously, such a move would trivialise what the metarepresentational account is trying to capture: that is, the fact that the speaker has chosen to mark the proposition embedded under the modal as a conclusion and to linguistically indicate the strength of this conclusion by the conceptual information encoded by the modal verb (including both the sort of logical relation and the type of evidence

involved in the inferential process). Naturally, assertions come with various degrees of speaker commitment which are often left implicit. In (69), for instance, the speaker may use intonational and other means to convey that her utterance is supported by all the evidence she possesses, although she cannot subscribe wholly to its truth because she manifestly still lacks some crucial information:

(69) Judy likes caviar.

In a case like (69), the strength ascribed to the proposition expressed by the utterance will be wholly pragmatically inferred, rather than computed on the basis of a linguistic trigger. By contrast, modal expressions, on their epistemic interpretations, typically mark the proposition embedded under them as a conclusion. In the specific case of English modal verbs, the conclusion is motivated in terms of inference; modal expressions in other languages may motivate a conclusion in terms of evidence from perception or from communication (for examples, see Palmer 1986 on modality; cf. also the evidential adverbs *apparently, clearly,* and *allegedly, reportedly*).

2.4.2 Epistemic interpretations of modals

Consider the following examples:

(70) a. Brian's resignation may be a big mistake.
b. Some of the neighbours must have seen the burglars.

The logical forms of the examples are given in (70'):

(70') a. It is compatible with the set of all propositions in domain D that $_{p}$[Brian's resignation is a big mistake].
b It is entailed by the set of all propositions in domain D that $_{q}$[Some of the neighbours have seen the burglars].

I will examine each utterance in turn. On hearing (70a), the addressee will have to

determine the domain of propositions in D. Suppose now that it is mutually manifest that the communicator does not know Brian very well. It is, then, reasonable for the addressee to assume that whatever the assumptions included in D, they are bound to be limited: although nothing in the speaker's beliefs excludes the possibility that Brian's resignation is a mistake, there may be circumstances in the world which actually do (but which the speaker is unaware of). Since the speaker does not trust the background assumptions she uses to evaluate p to accurately and fully match the state of affairs in the actual world, a root (:factual) interpretation for the modal verb becomes inappropriate. Instead, the speaker should be taken to communicate that p describes a possible conclusion with respect to a set of assumptions available specifically to her - the resulting interpretation is, naturally, epistemic.

Example (70b) is very similar to (70a). The proposition q has a determinate truth-value at present, since it refers to an event which either has or has not taken place in the past. The speaker cannot have intended a factual propositional domain as the value of D, since she manifestly lacks complete knowledge of what happened at the relevant time-slot in the past (i.e. during the burglary); all she can do, therefore, is reason on the basis of incomplete and partly-supported evidence which she reconstructs from both general encyclopedic and situation-specific information about burglaries (e.g. that the burglars have used one of the usual methods of getting into the house, that they were exposed at least some of the time, that the neighbours pay some attention to what takes place in nearby properties, etc.). Thus, q is presented as a necessary conclusion given an epistemic background domain.

This account captures Kratzer's insight that epistemic modality and root modality 'involve a different categorisation of the facts' (Kratzer 1981a: 52). In root interpretations, the modal domain includes propositions taken as descriptions of states of affairs; in epistemic interpretations, the modal domain D is relativised to a set of propositions which form part of the speaker's belief-set - and thus participate in her mental life. This is not to say that beliefs themselves are not truth-conditional descriptions of states of affairs external to the individual; however, when they estimate epistemic possibility or necessity, humans are not simply concerned with such 'transparent' properties of internally represented propositions, but focus rather on the representational properties (such as accuracy or completeness) of their belief-system

as such. In cases where the speaker has full cognitive access to assumptions that can determine the truth/falsity of the proposition embedded in the modal, there would be no need to relativise the modal restrictor to the domain of her beliefs; she could simply convey that the embedded proposition is compatible with/entailed by 'objective' circumstances or facts in the external world.

The metarepresentational analysis extends quite easily to the other modals. Consider (71), which has the logical form in (71'):

(71) That should be the plumber. (on hearing the doorbell)

(71') It is entailed by the set of all propositions in the normative domain that $_{p}$[That is the plumber].

The speaker cannot be certain that the circumstances in the actual world guarantee that p is true; the only evidence she has for p comes from her beliefs about the normal/expected course of events. According to those beliefs, the plumber is expected to arrive some time after the speaker called him: so if the circumstances in the world have developed as the speaker expects them to, it follows that whoever is ringing the bell is indeed the plumber. This explains why notions such as 'prediction', 'expectation' or 'probability' have been assumed to feature in the semantic entry of *should* (see Ehrman 1966, Walton 1988 and Bybee, Perkins and Pagliuca 1994 respectively). According to what the verb conveys, if reality develops in accordance with the speaker's expectations, the proposition embedded under the modal will turn out to be true (although it could still be contradicted by evidence which at present lies outside the speaker's cognitive environment).

This line of argument affords an explanation of the subtle differences between *must* and *should* when they function as epistemic markers. Consider the following pair:

(72) a. John must be easy to talk to.

b. John should be easy to talk to.

R. Lakoff, discussing these examples, has observed that they are appropriate in different circumstances (Lakoff 1972). Suppose that speaker and hearer are standing outside John's office: (72a) could be uttered if there were indications that John had a visitor and they were both having a good time. By contrast, (72b) would be acceptable if the speaker knew nothing about John's habits from first-hand experience, but had heard that in principle John was very kind with his students. Lakoff concludes that *should* is used in the case of a likelihood based on future expectation and verifiable in the future, and *must* of a likelihood based on present conjecture and verifiable in the present.

The interpretations Lakoff offers for (72) unfold quite easily from the proposed semantics for the two modals. Although both utterances are guesses based on partial evidence (and hence involve epistemic readings of the modals), each verb allows for a different restrictor, and, therefore, a different type of evidence. *Must* leaves open the type of evidence that supports the embedded proposition $_{p}$[John is easy to talk to]; in the situation Lakoff describes, the most accessible type of evidence capable of causing an adequate range of cognitive effects is John's behaviour with his visitor. *Should*, on the other hand, admits only evidence which is based on expectation; consequently, (72b) is appropriate when there is no direct experience of John's behaviour. The type of admissible evidence also bears on the verifiability of each utterance: in the case of perceived evidence, as in *must*, the embedded proposition p is verifiable at present, whereas expectation-based evidence, as in *should*, needs to await support or disconfirmation from factual assumptions.

I should note here that my analysis of *should* does not affect in any way the monosemy argument I have been advocating for the modals. On a first pass, one might be worried about the possibility of giving both root and epistemic interpretations to a verb which semantically admits only stereotypical or normative restrictors. This is not a real problem, however, since it is precisely that semantic information which allows for both types of interpretation in *should*: root interpretations occur when normative assumptions are regarded as representations of external states of affairs, whereas epistemic interpretations arise when the expectation-conforming evidence is focused upon *qua* set of internal propositional representations. In fact, the possibility of interpreting *should* as expressing both root and epistemic (weak) necessity while

retaining the feature of stereotypicality rather favours a unitary meaning approach over, say, an ambiguity view. On the ambiguity position, the verb would be ascribed two unrelated clusters of conceptual content, one having to do with social normativity (root interpretation) and the other with likelihood (epistemic interpretation - see Ehrman 1966 for an explicit adoption of this view). By contrast, the monosemy approach coupled with a metarepresentational stance on epistemic modality can naturally accommodate the fact that the specification of stereotypicality will 'percolate' from external to internal evidence for the embedded proposition.

A similar possibility arises with *ought to*, where the semantically specified domain is that of ideals, moral imperatives and the like:

(73) This problem ought to be very easy for a mathematical genius like you.

What about *can*? My semantic analysis precludes any epistemic uses for *can*, since the verb semantically restricts the value of admissible modal domains to the factual one. This restriction seems to receive support from the impossibility of constructing utterances where *can* is used instead of epistemic *may*:

(74) a. He may/?can have been joking when he asked if you cut your hair with a lawnmower.

b. Michael may/?can well get a first next year.

(75) Do you think that James is hiding something from the authorities?

a. He may be, and then again he may not.

b. ?He can be, and then again he cannot.

The intuition that *may* and *can* are typically used to communicate two distinct types of possibility has been expressed by several writers on modality. Leech (1987), for instance, argues that *may* expresses 'factual possibility' and *can* 'theoretical possibility'; van der Auwera (1986) takes *may* to convey indeterminacy and *can* contingency (see also R. Lakoff 1972, Bolinger 1989). What these authors standardly emphasise is the contrast between epistemic interpretations of *may* and root interpretations of *can*, as

well as the fact that *can* does not accept epistemic interpretations.[26] Let me go back to (75): in (75a), the speaker makes manifest that the proposition $_p$[James is hiding something from the authorities] is compatible with the set of her beliefs, and goes on (after some deliberation) to assert that the negation of this proposition (~p) is also compatible with her beliefs.[27] To put it differently, the speaker's current beliefs leave open the possibility for either p or ~p to come out as true: there is nothing unacceptable or ungrammatical here. By contrast, in (75b) the speaker communicates that p is compatible with the set of factual propositions - hence that the state of affairs in the actual world allows for p to be the case - and goes on to suggest that p is *not* compatible with the set of factual propositions - thereby creating a contradiction.

Using the root-epistemic contrast, we can also explain why *James may be hiding something* seems to rely much more on the future for the verification of the embedded proposition than *James can be hiding something*: in the former, but not in the latter, we expect the speaker's knowledge to develop so as to judge p as true or false. Similarly, we can account for the fact that in (76) it is the utterance containing *may* which expresses the greater likelihood that James is hiding something:

(76) James can be hiding something from the authorities; indeed, he MAY be hiding something from them.

The value of the restrictor in *can* being what it is, no 'percolation effects' can be used to elicit epistemic interpretations: these would violate the semantics of the verb. The presence of lexical-semantic factors which guarantee the non-convergence of *may* and *can* might be viewed as a means of securing a division of labour between the two lexical items - a synchronic situation which has gone through various stages of partial overlap of the meanings of the two modals (Tanaka 1990, Traugott 1989, Bybee, Perkins and Pagliuca 1994). The pressure for differentiation between the two verbs is probably also responsible for the relatively low frequency of 'simple root possibility' interpretations for *may* (since *can* grammaticalises precisely this part of the conceptual space of modality in English).

[26] *May* does, of course, accept root interpretations, as I have shown in section 2.3.1.
[27] On the scope of negation in epistemic modal interpretations, see section 3.1 below.

Still, one might argue, there are certain environments which can be said to elicit epistemic interpretations of *can* - specifically, interrogative, negative and 'generic' environments (Sweetser 1990, Walton 1988):

(77) a. Can this allegation (ever) be true?
b. This allegation can't be right.
c. Defamatory allegations can bring an end to a political career.

If these are truly epistemic interpretations of *can*, then the semantics I have proposed for *can* will turn out to be incorrect. However, I do not think there is any compelling reason to attach epistemic readings to the utterances in (77): the usual factual readings will do. Consider, for instance, (77b): *can't* is often said to give rise to the proposition in (78a), while on my account it rather conveys (78b):

(78) a. It is incompatible with the set of all the speaker's beliefs that $_p$[This allegation is right].
b. It is incompatible with the set of all factual propositions that $_p$[This allegation is right].

If (77b) communicates (78a), this will be the only case in English where an epistemic modal verb falls in the scope of negation. More generally, all utterances in (77) would fail the standard tests used to distinguish epistemic from non-epistemic interpretations of modals; since I intend to survey these tests in next chapter, I will postpone the discussion of the alleged epistemicity of (77) till after those heuristics have been introduced.

Let me sum up what I have claimed so far: Epistemic interpretations of modals arise in contexts in which it is mutually manifest that an individual, in drawing a conclusion, say p, is not in a position to take into account every proposition that could affect the truth of p, because he/she is ignorant of existing evidence. The individual will then draw the most justifiable conclusion according to presently available evidence, and the overall degree of support for it will depend on the degree of strength of the various premises. Stated differently, the individual ends up with a logical conclusion whose premises are

nevertheless more or less disputable, so that it is ultimately ascribed a correspondingly low degree of strength. What sets epistemic interpretations apart from other modal interpretations is that both the proposition embedded under the modal and the evidence for it are metarepresentational assumptions capturing the individual's internal representation of reality, which are likely to evolve and be revised, as new evidence becomes available.

Before finishing this section, I would like to show how the above analysis can be used to explain certain puzzles which have been discussed in the literature about the relation between a modalised assertion containing epistemic *must* and a non-modalised assertion. As Lyons (1977: 808) observes, 'although it might appear that a statement is strengthened by putting the proposition that it expresses within the scope of an operator of epistemic necessity, this is not so, as far as the everyday use of the language is concerned'. He remarks that an utterance such as (79a) is felt to be stronger than (79b) and to convey a higher degree of speaker commitment:

(79) a. San Marino is the country with the highest life expectancy in the world.
b. San Marino must be the country with the highest life expectancy in the world.

Contrasts in the *must-is* interface become more apparent when it comes to observational utterances, i.e. utterances that express propositions verifiable through/directly reporting facts from perception. Assume that Peter is watching a football match; at some point the ball is kicked off the field. Peter may produce either of the responses in (80) but he will be taken to be recommending a higher degree of commitment to the proposition expressed by (80a) than to the proposition embedded under *must* in (80b):

(80) a. That was an off-side.
b. That must have been an off-side.

The reason for the asymmetry is, of course, that (80a) is presented as a factual assumption, guaranteed by Peter's (uninhibited) perceptual access to his environment.

Perceptual beliefs, although not necessarily more likely to be true, are normally assumed to be causally related to the structure of reality; therefore, they are considered to be our securest form of contact with the world around us (Dancy 1985: 178). Since we trust our perceptual experience to deliver information of high epistemological respectability, it follows that other sources of knowledge (e.g. inference) will be valued less when it comes to the assessment of the same piece of information.

A similar point applies to the examples in (79a) and (b): again only the first is put forward as a piece of factual information, i.e. an assumption which the speaker trusts to be a true (or potentially true) description of a state of affairs in the world. What is more, on my analysis, epistemically interpreted modal verbs involve the metarepresentation of an assumption which is evaluated on the basis of evidence available to the speaker. So, although (79b) conveys that the speaker possesses compelling evidence about the country with the highest life expectancy, the possibility is left open for evidence lying beyond the speaker's beliefs to disconfirm the embedded proposition. This is what underlies the intuition that (79b) is weaker: by bothering to modify her proposition with an epistemic modal operator, the speaker explicitly indicates that she does not want to communicate the full range of effects the unmodalised utterance in (79a) would cause, or at least that she wants to moderate their strength.

On a relevance-theoretic account, (79b) is actually expected to produce extra or different cognitive effects in comparison to (79a) simply because it is both structurally and semantically more complex, and thus more costly in processing effort. The same prediction arises in other epistemic environments, which also require the setting up of a metarepresentation. Compare:

(81) a. There are nine planets in our solar system.

b. As far as I know/In my view, there are nine planets in our solar system.

2.4.3 Alethic and 'objective epistemic' modality

It would be interesting at this stage to compare epistemic modality with another type

of modal concept, which logicians have termed *alethic* (or logical) modality (McCawley 1981, Lyons 1977). A proposition is a logical necessity if it is entailed by the set of all propositions in the maximal domain D_{max} (where D_{max} is the set of propositions which jointly describe all logically possible states of affairs in the universe). A proposition is a logical possibility if it is compatible with the set of all propositions in the maximal domain D_{max} . The following are examples of logical possibility and necessity:

(82) a. I haven't won the Lottery yet, although in theory I could have.
b. It is possible that someone I know is going to win the Lottery.
c. Winning the Lottery does not necessarily make one happy.

Several linguistic discussions ignore alethic modality: Lyons' is a rather typical remark when he notes that alethic uses are the products of a 'rather sophisticated and impersonal process which plays little part in ordinary non-scientific discourse' and is 'secondary in the acquisition of language' (Lyons 1977: 845, 849). This is especially true with regard to the modal verbs in English (and in general); the alethic interpretation of *must* in (83) is, indeed, felt to be contrived:

(83) He is a bachelor, so he must be unmarried.

Still, since the boundaries between alethic and epistemic modal interpretations are often empirically hard to distinguish, there have been attempts at conflating the two types of modality. One line of argument has been to reduce alethic interpretations to epistemic interpretations, since they are not morphologically distinct in English, or, apparently, any other language (Palmer 1986: 11). The opposite suggestion has also been made: some writers have proposed that epistemic modality can (and should) be reanalysed as a subtype of alethic/absolute modality (Kneale and Kneale 1962: 93, Hughes and Cresswell 1968: 27; cf. Karttunen 1972: 14ff.): on this view, we could interpret (84) as conveying that it is absolutely/logically necessary that, if the premises are true, then the conclusion is also true:

(84) If it snows throughout February, my birthday must be a snowy day. (assuming the speaker's birthday is on the 11th February - adapted from Hughes and Cresswell 1968: 27)

There are good arguments against conflating epistemic and logical modality (Karttunen 1972).[28] First, alethic *must p* is stronger than the unmodalised proposition p, since the former means that p is not just true but necessarily true (true in all possible worlds). Epistemic *must p*, though, is felt to be weaker than p, for reasons explained in previous paragraphs.[29] Second, in modal logic *p* and *possibly ~p* are consistent. However, in natural language there is some incompatibility between the two clauses of:

(85) ?It isn't raining in Chicago, but it may be raining there.

Third, logically speaking, the form *must* $(p \rightarrow q)$ makes a different statement from $p \rightarrow$ *must q*. Yet there is little difference between the English forms in (86):

(86) a. It must be that, if Bill has a diamond ring, he has stolen it from someone.

b. If Bill has a diamond ring, he must have stolen it from someone.

As Karttunen (1972) has rightly observed, there is also a basic conceptual difference between the two types of modality. In my terms, the sort of assumptions that will be included in the modal restrictor differs in alethic and epistemic modality; as a result, it is a mistake to think that the one can be made to collapse into the other. One thing these analyses *were* right about was that alethic and epistemic modality bear a close relation; in fact, I think that the ability to entertain alethic concepts is essentially of the same type as the ability to employ epistemic notions, insofar as they both involve an aspect of metarepresentation.

[28] See also Iatridou (1990), who refers to logical modality as 'metaphysical' modality.
[29] This is why we can infer *p* from alethic *must p* but not from epistemic *must p*.

While discussing the facets of the human metarepresentational device in an earlier section, I mentioned metalogical activity as part of it. Metalogical processes consist in the subject's 'displaying' propositions as abstract hypotheses and consciously performing deductive operations on them; metalogical reasoning rests on the assumption that logical relations such as entailment, compatibility, contradiction and so on, obtain between propositional contents in the abstract, mind-independently. The interest in performing metalogical computations, then, lies in recovering these logical relations. Alethic/logical modality presupposes precisely an ability to reason about what is simply possible or necessary, thereby considering alternatives which are not included among presently available circumstances in the real world, or states of affairs described by the agent's current beliefs, but predicted by general logical laws.

What alethic modality shares with epistemic modality, then, is the fact that they are both instances of the interpretive use of propositions: they both rest on the capacity to envisage propositional representations as *representations* which enter into specific logical relations. Alethic concepts differ, however, in that they involve propositions viewed as mind-independent abstract entities, whereas epistemic concepts relate propositions which are treated as participants in the agent's mental life (and therefore require a fully set-up theory of mind).

Within the lexical-grammatical system of English modal expressions I have described, alethic interpretations of modals will come out as yet another possible enrichment of the underlying basic meaning of modals (in cases where it is permitted by the specified modal restrictor). It is true that the distribution of such interpretations is very restricted, especially as far as the English modal verbs are concerned; they seem to occur more freely with modal adverbs and adjectives as below:

(87) a. It is possible that there is life on other planets.

b. One in three necessarily wins.

The metarepresentational analysis of both alethic and epistemic modal concepts entails the following prediction: In case the logical domain and the epistemic domain turn out to be extensionally equivalent (i.e. if the speaker's knowledge spans all logical possibilities), then it will be impossible to differentiate between a logical and an

epistemic interpretation of a modal expression. Such 'mixed interpretations' do indeed occur: Lyons (1977) offers some examples and tentatively proposes that they belong to a separate category intermediate between epistemic and alethic modality. Imagine that a murder has occurred in a secluded hotel, where any communication with the outside world is impossible. The murderer then has to be one of the ten residents, who immediately become suspect and have their alibis checked by the police. After finding out that all of these suspects have unassailable alibis except for the guest in room 31, the police inspector produces (88):

(88) The guest in room 31 must be guilty.

Lyons (1977: 798) analyses similar utterances as cases of 'objective epistemic modality', where a conclusion reached by the speaker presents itself as an objective fact. He contrasts these with classic examples of epistemic modality, which is termed 'subjective' and is thought to be a product of 'opinion, or hearsay, or tentative inference' (Lyons 1977: 799). Apart from objective epistemic necessity, we find cases of objective epistemic possibility: in the same detective-story context, and before the investigation began, the inspector might utter:

(89) The guest in room 31 may be guilty.

Since this guest is among the ten residents in the hotel at the time of the murder, there is an objective possibility that he is the murderer. As Lyons puts it, 'the speaker might reasonably say that he knows, and does not really think or believe, that there is a possibility (and in this case a quantifiable possibility) of [this guest's being guilty]; and if he is irrational, his own subjective commitment to the truth or falsity of the proposition '[The guest in room 31 is guilty]' might be quite unrelated to his knowledge of the objective possibility, or degree of probability [1/10], of its truth, in the way that a gambler's subjective commitment to the probability of a particular number coming up in roulette might be quite unrelated to the objective probabilities' (Lyons 1977: 798).

That this is not really a distinct type of modal interpretation, but rather a conflation of two interpretations, can be argued for as follows. In the first place, Lyons' explanation faces a difficulty: the distinction between knowledge and belief, which is crucial for his distinction between objective and subjective epistemic modality, is at least dubious from a psychological point of view. Evidently the individual cannot distinguish knowledge and belief on subjective grounds alone. In examples (88) and (89), the individual's knowledge about the circumstances of the murder is - from an internalist perspective - equivalent to a set of strongly held beliefs, coupled with the assumption that there will be no further data which could have a bearing on the truth of these beliefs. This is guaranteed by explicitly stating all factors that could have a bearing on the identity of the murderer; the speaker can therefore be sure that no additional evidence will influence the truth of her statement about the guilt of the guest in room 31, so that her statement will be fully backed up by her cognitive environment. What appears to be an 'objective' sort of epistemic modality is thus a conflated type of interpretation, where ordinary epistemic necessity or possibility is evaluated with respect to a fully determinate and strongly supported body of evidence. What lies behind Lyons' intuition that this interpretation is close to alethic/logical modality is precisely the fact that the set of circumstances considered as evidence here span the range of logically possible circumstances; by being mutually manifest to the inspector and his interlocutor, this fact explains why (88), for instance, is perceived as a stronger statement than its unmodalised counterpart in (90):

(90) The guest in room 31 is guilty.

2.5 Concluding remarks

My aim in this chapter has been to strike a middle way between polysemy-based and radical monosemy accounts of English modals. I have tried to offer a semantics rich enough to allow for differences in content in the various modals, and yet underspecified to the extent of drawing on extensive pragmatic inferencing until it yields a complete truth-evaluable representation (:the proposition expressed by the modal utterance). I have attempted to draw together root and epistemic interpretations and to demonstrate how they can arise from what is - for most verbs -

a common basic meaning. Still, epistemic interpretations came out as significantly different from root ones: I have argued that the ability to employ epistemic concepts is part and parcel of human theory of mind abilities, and therefore epistemic interpretations of modals make use of metarepresentations in a way that root interpretations do not.

I have not yet fully cashed out what I have called the 'metarepresentation hypothesis' for epistemic modals. In the following chapters, I intend to go back to the types of evidence standardly adduced to support the existence of polysemy in English modals, and attempt a reanalysis in terms of the metarepresentation hypothesis.

Chapter Three

The Evidence for Polysemy Revisited (1): Removing Objections to a Unitary Semantics for Modals

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3.0 INTRODUCTORY REMARKS

The goal of the previous chapter was to provide arguments for a monosemy-based account of the English modal auxiliaries and to sketch a plausible pragmatic derivation of their various contextual interpretations. My next aim is to revisit two arguments which are widely considered to provide compelling evidence for the grammatical status of the root-epistemic distinction: the first is based on the isolation of specific clusters of grammatical features, whose distribution seems to uniquely determine either an epistemic or a root interpretation; the second includes tests which are meant to demonstrate the non-truth-conditional nature of epistemic modality markers. To these I will add a third point: the postulation by some authors of a distinct category for speech-act modality, set up as a natural extension of a polysemy-based account of modality. All three arguments are supposed to pose a challenge for any approach to the modals which assumes a 'flat', unitary semantics. Such approaches, the claim goes, are incapable of distinguishing between root and epistemic interpretations in terms of distribution or truth-conditional behaviour; moreover, they would be at a loss to fit speech-act modality into an already overloaded pragmatic machinery.

What I propose to do in this chapter is offer an explanation for the data invoked by each of the above arguments in terms of the metarepresentation hypothesis I have been advocating for epistemic modality. I will firstly claim that, far from being ill-adapted to capturing the differences between the two major classes of modal interpretations, the unitary semantic analysis put forth in the previous chapter can naturally accommodate them. Furthermore, the analysis can explain inconsistencies in

distribution and truth-conditional behaviour, which would be problematic on the alternative account. Finally, I will show how my metarepresentation hypothesis can deal with the category of speech-act modality in an economical and theoretically attractive way. If my analysis is right, then the areas of distribution, truth conditions and speech-act modality are indeed testing grounds for semantic/pragmatic theories of modality, but they do not demonstrate the superiority of lexical polysemy over other semantic alternatives as they have been claimed to do.

I will devote one section to each of the three arguments; the space allocated to each section (and argument) will gradually increase in proportion to the importance of the claims and the degree of originality of my own approach. The section on the (alleged) grammatical reflexes of the root-epistemic distinction (3.1) will be extremely swift; the discussion of truth-conditional behaviour (3.2) will involve going into the differences between the two clusters of interpretations in some detail; the final section on speech-act modality (3.3) could merit a chapter of its own.

3.1 EVIDENCE FROM GRAMMATICAL REFLEXES

A number of authors have suggested that the intended interpretation of a modal expression can be predicted on the basis of the grammatical properties of the linguistic environments in which the expression occurs. In what follows, I want to show that the series of alleged grammatical reflexes of the root-epistemic distinction can be reduced to natural aspects of the interpretation process.

Most of these grammatical reflexes have to do with the proposition embedded under the modal verb. Here is a list of properties of root and epistemic interpretations, as they appear in Coates (1983) (see also Coates 1995, Heine 1995, Palmer 1990, 1995, Steedman 1977, Sweetser 1990; cf. Picallo 1990):

(i) Negation. Epistemic modals take wider scope than negation (cf. (1)), while root modals scope under negation (cf. (2)):

(1) a. The situation may not be so bad.

b. Don't worry; the test should not take more than ten minutes.

c. My flat might not be what you expected.

d. They mustn't be tired: they have done practically nothing all day.

(2) a. You may not sit in front of the Queen.

b. One should not stay in the sun without a suntan lotion.

c. You ought not to think pessimistically.

d. I cannot climb any higher.

Must is a bit of a problem, since its root interpretation scopes over negation (see (3a)); in order to negate root necessity, a suppletive (*need to*) is used, as in (3b) - compare the use of *can't* as a suppletive for epistemic 'internal' negation in (3c):

(3) a. You must not tell lies.

= It is necessary/obligatory that you do not tell lies.

b. You need not tell lies; there are other means of getting what you want.

= It is not necessary that you tell lies.

c. You can't be serious.

= It is not possible that you are serious/

It is necessarily the case that you are not serious.

(ii) Yes-no interrogatives. Epistemic interpretations do not normally occur in *yes-no* interrogative structures, so that in (4) only the root readings can be intended:[1]

(4) a. May the drivers start the race?

b. Must he be leaving so soon?

(iii) Properties of the complement. Past or present tense marking, progressive aspect, expletive *there-* or inanimate subjects and stative verbs in the complement systematically co-occur with epistemic, rather than root interpretations, as the examples in (5) demonstrate:

[1] Interrogative-initial epistemics are acceptable in interpretive uses of language, e.g. when the current speaker echoes a previously uttered proposition in order to express an attitude towards it (see also the discussion of deliberative questions with epistemics later in this section):

A: This is what Chomsky believes, so it must be right.

B: Must it now?

(5) a. He must have been very ill then.

b. My parents must be at home at this very minute.

c. She may still be seeing him.

d. There should be an apple tree in the garden.

e. Crops ought to be good this year.

f. People in this part of the world may believe in strange gods.

Similarly, a predicate assigning the theta-role of agent to the subject in the complement points to root interpretations:

(6) You may go.

To begin with, let me note that, when Coates discusses the grammatical reflexes of the root-epistemic distinction, she essentially conflates root and deontic interpretations, although the latter are simply a subset of the former (as she herself has argued in her main analysis of modals); as a result, for instance, she only considers as root readings of *may* the permission-granting uses. In what follows, I take Coates' criteria to correspond to properties of epistemic vs. deontic uses.[2]

An obvious feature of Coates' distributional restrictions is that they are not supposed to be very strict: she frequently lists exceptions (which, moreover, are left unexplained), and she typically talks of tendencies rather than absolute criteria for the epistemic vs. root distinction. This already suggests that we are dealing with a pragmatic, rather than a semantic phenomenon. Let me examine each of her points in turn.

i. Negation. Although epistemic modals in English do not scope under negation, whereas root modals typically do, the exception of root *must*, which takes propositional scope, is an indication that, *pace* Coates, the scope facts cannot univocally determine the type of intended interpretation of a modal verb.

On the basis of the negation facts, it is generally taken for granted that, in English, epistemics have higher scope than root modals (root *must* is treated as an

[2] I should add that Coates' conception of epistemic interpretations is wider than my own, since it includes cases which I have called 'root' modality.

unfortunate exception - see Adger 1997). This conclusion is sometimes supported by the scope ordering of root and epistemic verbs or modifiers which co-occur in a single clause:

(7) a. I may have to leave early in the morning.
b. Possibly the children should stay at home as long as the rain lasts.

A similar ordering for modal verbs is impossible to obtain in British English due to grammatical constraints, but Brown and Miller (1975) report the following utterance from Scottish English:

(8) He must can do that.

The utterance is interpreted as in (9a) and not (9b) or (9c), in conformity with the data in (7):

(9) a. For all I know, it must be the case that he can do that.
b. He is required to be able to do that.
c. He is required such that it is possible to do that.

Still, it may well be that scope possibilities are independently specified by syntactic features of modal verbs and do not correlate in any interesting way with interpretation data. This approach has the advantage of taking seriously the exception of root *must*. Furthermore, it is not embarassed by Palmer's (1995) observation that in a number of languages (e.g. Danish, German, etc.), epistemic modality markers do scope under negation, and hence there is no conceptual reason for a strong association of epistemicity with wider scope (cf. also Picallo 1990).

ii. Yes-no interrogatives. There is an alternative explanation for the non-occurrence of epistemic modals in *yes-no* interrogatives, based on the pragmatic incongruity of such utterances. Imagine what an utterance like (4a) would convey on an epistemic interpretation of *may*. Assuming a relevance-theoretic analysis of interrogatives (Sperber and Wilson 1986/1995, Wilson and Sperber 1988a), and given

that it is a request for information, (4a) would most probably convey that the speaker would find its answer relevant to herself. However, no rational speaker can expect the hearer to supply her with a piece of information about her own belief-state, thereby giving a relevant answer to (4a). This is the reason almost all modals in interrogatives which are requests for information have root interpretations. I could only think of one instance where question-initial *must* is interpreted epistemically: imagine a doctor who, while reviewing the evidence she has collected about a patient, Alfred, utters the following self-addressed question:

(10) Must Alfred have cancer?

In (10), the speaker wonders whether it is necessary, according to her set of beliefs, that Alfred has cancer; that is, the speaker might well be questioning the epistemic validity of the conclusion that Alfred has cancer and looking for an alternative explanation for the evidence she posseses (i.e. Alfred's symptoms). This example suggests, then, that whether epistemics are acceptable in interrogative-initial position depends on the type of interrogative involved: at the beginning of requests for information, epistemic interpretations of modals are naturally inappropriate, whereas in deliberative questions such as (10) epistemic interpretations are possible. This is bolstered by the acceptability of the following interrogative formations with epistemics (cf. Coates 1983):

(11) a. Will that be the postman?
b. Shall this be the end of our journey?
c. Would the silence signify that you admit your guilt?[3]

[3] Recall the so-called epistemic uses of *can* which I mentioned in chapter 2. One of them, the negative use, appears in example (3c) above; cf. interrogative and 'generic' uses of *can*, which are supposed to carry an epistemic reading - I repeat my earlier example for convenience:

a. Can this allegation (ever) be true?
b. This allegation can't be right.
c. Defamatory allegations can bring an end to a political career.

My proposed semantics for *can* disallows genuine epistemic interpetations of the verb; therefore, I suggested in chapter 2 that the uses in (a-c) are normal factual uses of *can*. Some support for this claim can now be adduced from the behaviour of epistemic modals in *yes-no* interrogatives and negative environments. As we saw earlier, interrogative-initial modal verbs can be interpreted epistemically only in deliberative questions, while root interpretations do not impose any restrictions on the type of interrogative they occur in: since (a) may be a well-formed request for information as well as a deliberative question, it follows that *can* is here interpreted as a root verb. Likewise, in (b) if *can't* is indeed an epistemic, it will be the only case of an English epistemic modal which falls in the

iii. Grammatical properties of the complement. Consider the deontic interpretations of *must, may, can, should*, etc., on which either permission is granted to do something, or an obligation is issued to perform some act. It is an inherent property of both granting permission and imposing an obligation that certain conditions have to obtain in the situation of utterance (what speech-act theorists like Searle (1969) have called 'felicity conditions' on speech acts). For instance, permission is typically granted for an activity (not a state), which will be carried out in the future (not the past or the present) by one or more agents; and likewise for obligation. These constraints are based on the strong assumption that it is not possible to influence past situations by acts carried out in the present, due to the 'predominant futureward direction of causation' (Lewis 1973b: 36). Such independent considerations are responsible for the systematic priming of non-deontic interpretations of modals by complements marked for past tense.

That such co-occurrences are not grammatically but conceptually enforced is bolstered by the following observation: If we construct contexts in which our standard assumptions about causation and permission/obligation are absent (involving, for intance, science fiction or religion), it should be possible to retrieve permission/obligation interpretations of modals which do not obey Coates' constraints. Imagine, for example, that an omnipotent superhuman force decides to answer the prayers of an endangered spaceship crew and save them. In that context, an utterance such as (12) would be acceptable as granting permission:

(12) You may never have left Earth.

This line of reasoning explains Coates' further observation that epistemic interpretations are favoured by complements with present tense marking: granting permission or imposing an

scope of negation. Despite the traditional classification of *can't* as a suppletive form for internal epistemic negation ('it is epistemically necessary that not'), I think it is equally possible to take the verb as having its usual root reading (thereby communicating the stronger 'it is factually necessary that not'). Finally, so-called generic uses such as (c) do not involve epistemicity but rather a generalisation over factual instances, i.e. a habitual reading. Similar considerations apply to uses of *could*, which have been assigned 'epistemic' overtones:

a'. Could this allegation be true?
b'. This allegation couldn't be true.
c'. Defamatory allegations could bring an end to a political career.

obligation cannot involve a currently obtaining state of affairs - hence, deontic interpretations are disallowed by modal complements marked for present tense.

Let me move on to a range of properties of the complement of the modal which, according to Coates, are associated with epistemic interpretations. I will argue that these are not, in fact, invariable indicators of epistemics. Consider (13)- (15):

(13) a. One must be watching the children every minute, otherwise who knows what they'll come up with.

b. We must be leaving soon.

(14) a. I must be the best chess player there is.

b. You must believe in God, or they'll burn you at the stake. (from Steedman 1977)

(15) a. There must be law and order in the country.

b. The books must be on the library shelves by Monday morning.

The examples in (13) show that the presence of progressive aspect in the complement of the modal does not uniquely impose an epistemic interpetation. Similarly, the utterances in (14) demonstrate that stative verbs in the complement are not a sufficient condition for epistemic readings. Furthermore, expletive *there-* or inanimate subjects in the complement do not occur exclusively with epistemics, as (15a) and (15b) respectively show. A range of features of the complement which have been thought to call for epistemic modal readings thus appear to co-occur unproblematically with root interpretations.

Likewise, Coates' agentivity criterion appears to be neither necessary nor sufficient for a root (deontic) interpretation. This is shown by a simple comparison between (6) and (16a)/(16b) respectively. (16a), uttered to a newly-hired butler by the lady of the house, can receive a permission interpretation, although the complement of *may* is non-agentive; (16b) contains the same (agentive) verb as (6), which cannot guarantee a permission interpretation:

(16) a. You may become the first butler in this house to have two free evenings a week.

b. You may go, but then again if you're not invited, you may end up not going.

It appears, therefore, that Coates' distributional criteria cannot function as strict grammatical reflexes of root or epistemic modal readings. At this point, I would like to deal with two potential objections to my arguments. The objections could be formulated as follows:

> First, one might retort, the purported counterexamples offered above do not necessarily invalidate Coates' criteria. Consider (14): the example is designed to show that, *pace* Coates, the presence of stative verbs in the complement of a modal does not rule out root interpretations. However, in (14a) (*I must be the best chess player there is*), *be* is not in fact interpreted as a stative predicate: rather, it is understood as marking the beginning of a state (one in which the speaker is the best chess player). This inchoative interpretation corresponds to an achievement, and achievements are agentive events. Likewise in (14b) (*You must believe in God, or they'll burn you at the stake*), *believe* is understood inchoatively as an achievement (i.e. the beginning of the state of believing); alternatively, it is understood as 'show that you believe/pretend to believe when asked'. On either of these interpretations, the complement of the modal denotes an agentive event, and therefore conforms to the prerequisites for root readings noted by Coates.
>
> More importantly, though, Coates' criteria, even if not fully correct as they stand, home in on what appears to be a genuine difference between root and epistemic modal interpretations. Her approach squares well with a long-standing intuition in the literature that there is a deeper distinction to which the root-epistemic distinction can (and should) ultimately be reduced. In the old days of transformational grammar, the underlying distinction was considered to be that between transitivity and intransitivity: root modals were transitive, whereas epistemic modals were intransitive (Perlmutter 1971, Jackendoff 1972). Later, the root-epistemic distinction was seen as connected with the distinction between control and raising verbs; for example, it was observed that a number of verbs can occur in both control and raising structures, where the former are characterised by the presence of an agent argument: examples include aspectual verbs such as *begin, start, continue, stop*, verbs like *threaten*, etc. (Perlmutter 1970, Postal 1974, Steedman 1977; cf. the French aspectuals *commencer, continuer*, and also the verbs *passer pour, menacer, promettre, mériter*, etc. - Ruwet 1991: 58, Zubizarreta 1982: 71ff.):

(17) a. The students threatened to take over the building.

b. The students threatened that they would take over the building.

Now consider (18): its root reading (corresponding to the control structure) conveys that the person who gives permission for the children to sleep outside is happy to do so, while its epistemic reading (corresponding to the raising structure) communicates that it is likely that the children will enjoy sleeping outside:

(18) The children may happily sleep outside.

The control-type status of root readings was invoked to explain the typically future-oriented ('irrealis') interpretation of root modal complements: in other words, the root complement was assumed to be non-finite or to lack a 'world-index' (cf. Huntley 1984). By contrast, epistemic modals were assumed to range over complete (finite or 'world-indexed') propositions. The difference between root and epistemic readings in modals is brought out in example (19), where (19a) has a typically root reading and (19b) has a typically epistemic reading:

(19) a. It is possible for the children to sleep outside.
b. It is possible that the children will sleep outside.

What underlies all these approaches is the idea that the root-epistemic distinction ultimately relates to the difference between (dynamically unfolding) events in the world caused by agents and (stative, extended) situations/states of affairs which obtain independently of agency. The 'agentive event vs. state' alternation obtains in a variety of constructions - many authors note that the distinction is manifested in the complements of verbs such as *expect, convince, insist, decide*, etc. (Jackendoff 1985, Tregidgo 1982, Sweetser 1990):

(20) a. I convinced them to go to Rome.
b. I convinced them that they had to go to Rome.

Here is my reply to these objections. Firstly, recall that Coates adopts a polysemy approach to the English modals; as a result, she views the clusters of properties listed under (i)-(iii) as grammatical reflexes of root or epistemic meanings. On her view, therefore, the computation of the intended interpretation of modals presumably takes place in a completely structure-driven way. It is this strong view that my counterexamples in this section were meant to question. Now the first objection above implies that Coates' features might be seen as conceptual rather than grammatical requirements for root or epistemic modal interpretations: for instance, it gives good

evidence that the requirement for a non-stative verb in the complement of root modals holds not on the level of semantic encoding (*be* in (14a) and *believe* in (14b) are lexically stative) but on the level of conceptual structure. It is, therefore, conceptual reasons which impose the pragmatic reinterpretation of *be* and *believe* as non-statives.[4] This conclusion is entirely in keeping with my own position on the modals, according to which Coates' criteria correspond to natural aspects of the interpretation process; it is also compatible with the view that configurational properties of modals simply favour - rather than determine - either root or epistemic interpretations. I will say more about the role of distributional properties of modals after dealing with the second point.

The second objection involves the desire to reduce the root-epistemic distinction to something more basic; it is not clear, however, whether the underlying distinction is supposed to be a syntactic or a conceptual one (or, as some people believe, a conceptual one with systematic syntactic realisation; cf. Jackendoff 1985). As I have argued above, syntactic facts alone seem inadequate to uniquely determine modal interpretations. I will mention only two examples by way of illustration, one of which is old and the other new. Firstly, if a syntactic explanation can be given for Coates' criteria, one is left with the problem of exceptions: for example, a purely syntactic approach would presumably rule out the interrogative-initial occurrences of epistemic modals in (11) or (12) as ungrammatical (cf. Adger 1997). Secondly, most syntactic analyses of modality have focused on epistemic and a subset of root (i.e. deontic) interpretations, thus ignoring other types of modality found in natural language. An exhaustive account would also have to include, for instance, alethic or simple root interpretations. It is unlikely, however, that every type in the full range of modal interpretations can be differentiated from the rest on syntactic grounds. Take scope facts: as shown by (21) below, both alethic and epistemic interpretations pattern uniformly with respect to scope and complement finiteness in that they both range over complete propositions; consequently, (21) can have either an alethic or an epistemic reading:

(21) It is possible that I will win the jackpot.

[4] On the interaction of semantic and pragmatic factors in the computation of aspect, see Dowty (1986).

It follows that syntactic facts underdetermine, rather than streamline, the interpretation of modal expressions. Grammatical properties such as scope, or the nature of the complement of the modal verb, are simply one of several factors which contribute to the comprehension of modals.

At various points above, I have suggested that Coates' (and other authors' - see objection 2) observations on the grammatical reflexes of the deontic-epistemic distinction are best seen as generalisations about the conceptual representations of these two kinds of interpretations. Recall the properties of root (deontic) interpretations: one cannot grant permission or impose an obligation with respect to a past or present state of affairs - thus, deontic modal complements obligatorily receive future interpretations. Similarly, deontic interpretations involve acts typically performed by (normally human) agents (i.e. agentive events) - hence the difficulty of having expletive *there* or an inanimate subject in the complement of a deontic modal. Furthermore, the act involved in deontics is usually seen as instantaneous - stative verbs or progressive aspect in the complement thus prime epistemic readings. More generally, deontic interpretations are closely linked to the notion of agency, or agent-based causality, which is absent from epistemic interpretations - if one adopts a conceptual rather than a syntactic definition of agency.

It might seem that a conceptual account of the distribution of deontic and epistemic modality misses the generalisation behind the raising-control alternation noted above. In fact, a strong piece of evidence for the conceptual account comes from a recent discussion of raising and control phenomena by Ruwet (1991). According to Ruwet, the class of verbs (including modals) which exhibit mixed control-raising behaviour is far from homogeneous. After examining a wide array of data, Ruwet concludes that the alternation is not likely to be explained on syntactic grounds alone, and offers a tentative conceptual explanation based on what he calls an 'external vs. internal point of view' (Ruwet 1991: 80). Although this is not the place to expand on his position, the idea that a purely formal approach to the raising-control alternation should be abandoned in favour of a conceptual account is very similar in spirit to the approach I have outlined in this section.[5]

[5] This is not to say that our accounts do not differ; see Ruwet (1991: 81).

Where does the present discussion leave us with respect to polysemy analyses of English modals? To the extent that distributional features of modal verbs do not uniquely determine the intended modal interpretation, it becomes implausible to view epistemic and root (deontic) readings as two separate encoded clusters of modal meaning with different grammatical properties. Grammatical features, such as the aspect or tense of the complement, may typically favour one or the other interpretation of a modal expression by contributing in specific ways to the main conceptual representation explicitly communicated by the utterance (i.e. the proposition expressed by the utterance).

3.2 EVIDENCE FROM TRUTH-CONDITIONAL BEHAVIOUR

3.2.1 The standard view

It is widely assumed in the linguistics literature that one of the crucial differences between root and epistemic modality is that the former, but not the latter, contributes to the truth-conditional content of the utterance. Specifically, it is generally agreed that epistemic modality expresses some sort of comment on the proposition expressed by the rest of the utterance. Halliday, for instance, writes:

> [Epistemic modality] ... is the speaker's assessment of probability and predictability. It is external to the content, being a part of the attitude taken up by the speaker: his attitude, in this case, towards his own speech role as 'declarer'. (Halliday 1970: 349)

Lyons (1977) makes similar observations. Following Hare (1970), he distinguishes three levels of increasingly wide scope in the structure of utterances: the phrastic, which corresponds to the propositional content of the utterance; the tropic, which indicates the sort of speech act that the sentence is characteristically used to perform ('a sign of mood'); and the neustic, which indicates 'a sign of subscription' to the speech act performed - i.e. the speaker's commitment to the factuality, desirability, etc. of the base proposition (ibid. p.749). Lyons places epistemic modality[6] outside the proposition expressed and within the

[6] In his terms, 'subjective epistemic modality'; cf. the discussion in section 2.4.3 above.

neustic component of the utterance. In an utterance like (22), for instance, the speaker indicates that she entertains the embedded proposition [There (will) be some rain tomorrow evening] with a weak degree of strength, and thus the hearer is recommended a correspondingly low degree of commitment to it:

(22) There may be some rain tomorrow evening.

More recently, Sweetser, in her analysis of the English modal system (Sweetser 1990), suggests that epistemic modals do not contribute to what she calls the 'content' level of the utterance, but rather to the level at which the proposition expressed by the utterance is entertained as an epistemic object (i.e. an object of belief) and is subjected to inferential manipulation (see also Nuyts 1993).

A number of authors have proposed that epistemic modality typically marks 'subjectivity' in language, a property which is held to account for the non-truth-conditional status of epistemic modal items. Subjectivity is a rather loose term for the degree of the speaker's commitment and affective involvement in the content of the proposition she wishes to convey (Coates 1983, Langacker 1990, Sanders and Spooren 1997). Palmer (1986: 54-5), for instance, suggests that epistemic modality in natural language is essentially subjective, in that it indicates 'the status of the proposition in terms of the speaker's commitment to it'. Likewise, Traugott (1982, 1988, 1989, 1995) views the rise of epistemic meanings of modal lexical items as an instance of a general historical development towards subjectification in language. After examining the meanings of various modal terms in English (modal auxiliaries, speech-act verbs and modal adverbs) through gradual grammaticalisation from an initial root domain to the epistemic domain, Traugott concludes that meanings in natural language 'tend to be increasingly based in the speaker's subjective belief state/attitude toward the proposition' (Traugott 1989: 35), and takes epistemic elements to be indicative of that tendency in that they 'express beliefs about the truth of the proposition' (ibid. p.43).[7] Finally, Bybee and Fleischman (1995a) epitomise current views on epistemic modality by emphasising its relationship to the category of

[7] I return to Traugott's views on 'subjectification' and the historical development of modal expressions in Appendix 3A and chapter 5.

evidentiality and pointing out that 'epistemics are clausal-scope indicators of a speaker's commitment to the truth of a proposition' (Bybee and Fleischman 1995a: 6).[8]

There are various types of evidence adduced to support the non-truth-conditional properties of epistemic modality. I have already mentioned the fact that epistemic modality scopes over negation and does not occur in *yes-no* interrogatives. Lyons (1977: 799) mentions further the resistance of epistemic modality markers to scoping under an attitude of doubt/rejection/acceptance or to attaching to the complement of a factive predicate or a verb of telling; the utterances in (24) are unacceptable as responses to the epistemic statement in (23), while those in (26) are fine given that the modal in the preceding utterance - (25) - is assigned a root reading:

(23) Alfred must be secretly seeing Barbara.

(24) a. ?Is that so? (= Is it the case that A. must be secretly seeing B.?)

b. ?I don't believe it. (= I don't believe that A. must be secretely seeing B.)

c. ?I agree. (= I agree that A. must be secretly seeing B.)

d. ?It is surprising that Alfred must be secretly seeing Barbara.

e. ?Mary told us that Alfred must be secretly seeing Barbara.
(other than reported speech)

(25) The area must be evacuated.

(26) a. Is that so? (= Is it the case that the area must be evacuated?)

b. I don't believe it. (= I don't believe that the area must be evacuated)

c. I agree. (= I agree that the area must be evacuated)

d. It is surprising that the area must be evacuated.

e. Mary told us that the area must be evacuated.
(other than reported speech)

Taken together with the point that epistemic modality indicators have clausal scope, such evidence suggests that epistemic modality in fact scopes over the proposition expressed by the (rest of the) utterance. The epistemic operator expresses the speaker's

[8] The idea that modality in general is external to the proposition expressed by an utterance also seems to have a long tradition in philosophy (for a survey, see Rivero 1972).

attitude towards this base proposition; consequently, it cannot co-occur with other attitude operators, as the unacceptability of (24a-d) illustrates. By contrast, (26a-d) are acceptable when understood as responses to the base proposition (i.e. the complement of the epistemic modal):

(27) a. Is that so? (= Is it the case that A. is secretly seeing B.?)
b. I don't believe it. (= I don't believe that A. is secretely seeing B.)
c. I agree. (= I agree that A. is secretly seeing B.)
d. It is surprising that Alfred is secretly seeing Barbara.

As a further test, consider placing utterances containing epistemic and root modals in the scope of logical operators:

(28) a. ?If John must have a high IQ, then his teachers should treat him carefully.
b. ?If that blonde may be Jack's wife, we should keep quiet about the secretary.
(29) a. If John must leave, then I will leave too.
b. If money may rule, then there's no justice.

As (28) illustrates, in English it is normally impossible to have epistemically used modals in the antecedents of conditionals. Root modals, by contrast, are subject to no such restriction, as shown in (29).

In conclusion, it appears that epistemic modal items do not interact compositionally with elements of the proposition expressed by the (rest of the) utterance. In other words, it appears that epistemic modality markers introduce a multi-layered proposition, only part of which (:the proposition embedded in the modal) contributes to the truth conditions of the utterance. To illustrate, consider the following example of epistemic modality:

(30) The prices in the restaurants overlooking the river must be the highest in town.

According to the view outlined in the previous paragraphs, (30) communicates the double-level proposition in (30'):

(30') a. The prices in the restaurants overlooking the river are the highest in town.

b. As far as I know, it must be the case that (a).

(30'a) represents the proposition expressed by (30), or the truth-conditional content of (30). (30'b) is distinct from this basic (ground-floor), truth-conditional proposition; its role is to fine-tune the interpretation of the base proposition. Therefore, (30'b) is interpreted as a comment conveying the degree of speaker commitment to the proposition expressed by the utterance.

The behaviour of epistemic modality markers with respect to tests for truth-conditionality might seem to present a problem for the univocal analysis of modality advocated in chapter 2; quite independently of that, it is an interesting fact, which should be captured by any semantic/pragmatic analysis of modal phenomena. This is the way I propose to proceed: In section 3.2.2 I will discuss the idea that epistemic modal expressions (along with a variety of other constructions) introduce more than one act of communication, or a multi-layered proposition. In section 3.2.3, I will provide an alternative account which does not assume non-truth-conditional properties for epistemic modality; more specifically, I will show that my analysis of epistemicity in terms of metarepresentation can naturally accommodate the patterning of epistemic modal expressions with respect to the diagnostics for truth-conditionality.

For the moment, I want to consider some preliminary reasons for scepticism about the claim that epistemic modals do not contribute to the truth-conditional content of the utterance. Consider first the 'symmetry of enrichment' argument. I have argued so far that the variety of contextual interpretations of the English modals (simple root, deontic, etc.) is mostly the result of pragmatic enrichment of their underspecified semantic content. If epistemic interpretations are considered non-truth-conditional, the epistemic domain will be the only domain which does not contribute in the regular way to the construction of the proposition expressed. Although not decisive, this argument nevertheless provides some motivation for maintaining a

symmetrical picture of the proposition expressed by utterances containing a modal verb (other things being equal).

One might retort here that the epistemic domain is, on anybody's account, different from other propositional domains. The standard view, as described above, holds that, to the extent that they involve the speaker's beliefs, epistemic interpretations are 'subjective', and are therefore not expected to contribute to truth conditions at all. However, the notion of subjectivity as standardly used in connection with epistemicity is singularly ill-equipped to help with the issue of truth conditions. The reason is that, as a number of authors emphasise, subjectivity is a graded notion, and modals differ with respect to their position on the continuum of subjectivity (Coates 1983, Langacker 1990, Palmer 1986). The question then arises: what do degrees of subjectivity amount to in truth-conditional terms? For two-valued logic at least, gradience in subjectivity cannot be matched by a graded contribution to truth-conditional content. Hence, subjectivity does not settle the issue of truth conditions for epistemics; rather, it muddles it.

There is a second strong argument against the standard view, which appeals to our intuitions about truth conditions. Consider (31):

(31) a. The judge may find this file interesting.
b. The judge must find this file interesting.
c. The judge will find this file interesting.

Suppose it turns out that the judge does not find this particular file interesting. Does this make the utterances in (31a-b) on their epistemic interpretations false? I don't think so. What the speaker has said is that, as far as she knows, it is possible/necessary that the judge will find the file interesting. (31a) and (b) are clearly different from (31c), which would indeed be proven false in the circumstances I have described.

3.2.2 Multiple acts of communication

The idea that an utterance may communicate a multi-layered proposition is a familiar one: from the early speech-act literature onwards, a number of constructions or

expressions have been thought to give rise to similar, double-level propositions. I will look at two cases which are frequently mentioned in connection with epistemic modality: evidential markers and parenthetical/performative verbs.

Consider first evidentiality. According to the standard (functional) definition, evidential markers show the kind of justification for a factual claim which is available to the person making that claim (Anderson 1986; cf. Bach and Harnish 1979, Urmson 1963, Slobin and Aksu 1982, Willett 1988, Palmer 1990, Mayer 1990, Ifantidou 1994). As a result, evidential expressions are generally expected to carry information about the source of the speaker's knowledge (observation; communication; inference; memory) and/or the degree of speaker certainty (strong/weak). Crucially, evidentials are not themselves the main predication of the clause, but are rather 'a specification added to a factual claim ABOUT SOMETHING ELSE' (Anderson 1986: 274-5, his emphasis).

Consider the examples of evidential and hearsay adverbials in (32) and (33)[9]:

(32) Obviously, Mark is going to get the job.

(33) Allegedly, Mark is going to get the job.

The utterances in (32) and (33) are assumed to give rise to the double-level propositions in (32') and (33') respectively:

(32') a. Mark is going to get the job.

b. It is obvious that Mark is going to get the job.

(33') a. Mark is going to get the job.

b. It is alleged that Mark is going to get the job.

According to standard speech-act analyses (Bach and Harnish 1979, Urmson 1963), the propositions expressed by (32) and (33) are (32'a) and (33'a) respectively. The propositions (32'b) and (33'b) are also communicated by the original utterances, although their role is a different one: 'They help the understanding and assessment of what is said rather than being part of what is said' (Urmson 1963: 240). In (32), the sentence adverbial *obviously* marks the evidential support which the ground-level

[9] Note that, on this definition, hearsay markers are a subtype of evidentials.

proposition (32'a) receives in the speaker's cognitive environment; in (33), the adverbial *allegedly* marks the source of the information conveyed by the base proposition as external to the current speaker (i.e. it marks the information as a product of communication).

The second class of items I want to examine here includes parenthetical verbs such as *I believe, I conclude, I guess*, etc. (and, secondarily, certain performatives such as *I admit, I infer, I presume*, etc.). The function of these items is generally seen as very similar to that of the parenthetical adverbials introduced in the previous paragraphs. Urmson (ibid. p.225) summarises the role of parenthetical verbs in the following way: 'We make our statements in contexts, social as well as logical. For example, we often have an emotional attitude to the fact we state... Further, we make our statements sometimes with good, sometimes with moderate, sometimes with poor evidence... It is my contention that parenthetical verbs are some of the devices that we use to deal with these matters... By them we prime the hearer to see the emotional significance, the logical relevance, and the reliability of our statements'.

To illustrate, consider the pair in (34) - (35):

(34) I admit that I was unaware of the crisis. (said by the President)

(35) The President was, I believe, unaware of the crisis.

The above utterances are seen as communicating the multi-layered propositions in (34') and (35'):

(34') a. The President was unaware of the crisis.

b. The President admits that he was unaware of the crisis.

(35') a. The President was unaware of the crisis.

b. The speaker believes that the President was unaware of the crisis.

As before, the truth-conditional content of the utterances in (34) and (35) is assumed to be given by (34'a) and (35'a). The propositions in (34'b) and (35'b) are considered to be indications of how the base propositions are to be taken. In the first case, *I admit* indicates how the base proposition 'fits logically into the discourse' - 'one is not

reporting the occurrence of a bit of admitting, whatever that may be supposed to be' (Urmson 1963: 226); in the second case, *I believe* marks the degree of reliability of the ground-floor proposition (cf. Bach and Harnish 1979).[10]

It is easy to see why epistemic modality has been traditionally associated with evidentiality and parenthetical verbs such as *I conclude, I guess*, etc. Modal verbs, on their epistemic interpretations, convey information about both the source of the speaker's knowledge (i.e. inference) and the degree of speaker certainty (strong in *must*, weaker in *may*): in this sense, they can be said to properly belong to the class of evidentials.[11] Likewise, epistemic modals mark the proposition embedded under them as a conclusion with variable degrees of support from available evidence: in this sense, they may be compared to parentheticals such as *I infer, I conclude*, and so on. In all these cases, the modals seem to indicate how the hearer is to 'take' the proposition expressed by the rest of the utterance.

Still, I want to argue that the parallel with sentence adverbials and parenthetical verbs is not quite accurate. The reason is that it overlooks the crucial fact that epistemic modals are not parenthetical expressions: while evidential and hearsay adverbials and parenthetical verbs are only loosely attached to the rest of the utterance, both syntactically and phonologically,[12] epistemic modals are the main predication of the utterance. Whereas parenthetical expressions may be seen as contributing to non-basic propositions which simply fine-tune the interpretation of the ground-floor, truth-conditional representation communicated by the utterance, epistemic modals cannot easily be detached from the ground-floor proposition (e.g. through comma intonation, or free word movement). This fact squares well with the observation (at the end of the previous section) that we do have intuitions which treat epistemic modality as part of the truth-conditional content of the utterance. It seems, therefore, that epistemic

[10] Grice (1989) has made similar suggestions about sentence connectives such as *but, therefore, moreover*, and parenthetical expressions such as *on the other hand*: what the connectives or parentheticals contribute to communicated meaning is an indication of a higher-order speech act which comments in a certain way on the ground-floor proposition. For a relevance-theoretic analysis of these expressions, see Blakemore (1987).

[11] Here, as above, I adopt a functional characterisation of evidentiality. There are alternative, semantic definitions of evidentiality in the literature: according to Anderson (1986), genuine evidentials are those expressions which primarily *encode* information about evidence. It follows that, on a unitary semantic account of modals, epistemic interpretations would fail Anderson's semantic criterion of evidentiality (since they would be computed through pragmatic inference and not semantic decoding).

[12] For a thorough treatment of such 'disjunct constituents', see Espinal (1991).

modality cannot be handled in exactly the same way as evidential sentence adverbials and parentheticals, and that the parallel between the two classes of constructions has to be reformulated. Incidentally, epistemic modals seem to behave in this respect more like the class of performative verbs such as *I infer, I conclude*, etc. in their non-parenthetical uses: these verbs are also syntactically fully integrated, and form a non-detachable part of the utterance.

To prepare the ground for a more detailed comparison, I would like to look at some recent analyses of examples of the type in (32)-(35) by Elly Ifantidou and Diane Blakemore within the relevance-theoretic framework. Ifantidou (1994) provides a detailed analysis of evidential and hearsay adverbials as well as parenthetical verbs. Her analysis generally preserves the assumption that both parenthetical adverbials and parenthetical verbs do not contribute to the proposition expressed by the utterance; their role is to participate in the construction of explicitly communicated higher-level propositions (higher-level explicatures) - cf. the propositions (32'b), (33'b), (35'b) above.[13] According to Ifantidou, the role of these higher-level propositions in the above examples is to fine-tune the comprehension of the base proposition (i.e. the proposition expressed by the utterance) in specific ways. For instance, evidential adverbials indirectly affect the strength with which the base proposition is held. The degree of strength communicated obviously varies according to the semantic content of the evidential adverbial: weak evidentials (*apparently, seemingly*, etc.) indicate a reduced degree of strength; strong evidentials (*obviously, clearly*, etc.) indicate a high degree of strength. By affecting the degree of strength attached to the base proposition, both weak and strong evidentials also affect the degree of strength recommended to the hearer.

[13] In fact, Ifantidou recognises truth-conditional as well as non-truth-conditional uses of evidential and hearsay adverbials; in this respect, her account differs from speech-act accounts which insist on the non-truth-conditionality of all sentence adverbials (including illocutionary and attitudinal adverbials). For instance, she claims that truth-conditional uses can fall under the scope of logical connectives, as in (i) and (ii) below:

(i) a. The cook obviously won't poison the soup.
b. If the cook obviously won't poison the soup, we can eat the meal without worrying.

(ii) a. The cook has allegedly poisoned the soup.
b. If the cook has allegedly poisoned the soup, the police should make an inquiry.

However, we still do not have adequate justification for the presence and distribution of both truth-conditional and non-truth-conditional uses for evidential and hearsay adverbials; Ifantidou simply notes that 'a parenthetical comment which... merely expresses the speaker's attitude to the fact that [the ground-floor proposition] is true... will be perceived as non-truth-conditional' (1994: 189).

Hearsay adverbials are a different case. Their role is to mark the base proposition as a case of interpretive use. (33'b) above, for example, attributes the base proposition to someone other than the current speaker, thereby waiving the present speaker's direct commitment to it. Other examples may communicate an indirect commitment to the base proposition, in case the current speaker trusts its original source.

Finally, Blakemore (1990/1) has analysed the class of performatives such as *I predict, I infer, I conclude*, and so on. Following Sperber and Wilson (1984), she takes these to correspond to *non-communicated* speech acts (and calls them *non-communicated performatives*): for instance, making a prediction does not involve the formation and recognition of manifest intentions about speech-act type; the necessary conditions for predictions have to do with the content communicated - hence prediction is not a communicated act.[14] The gist of Blakemore's account is that non-communicated performatives give rise to a double-level proposition. She argues against speech-act accounts and claims (with Recanati 1987) that such performative verbs should not be seen as external to the proposition expressed by the utterance. Although an utterance such as (34) cannot be seen as describing an existing state of affairs or reporting one of the speaker's beliefs, it does still represent a state of affairs. For instance, in producing (34) the speaker may be presenting evidence for the truth of the proposition in (34'b). Blakemore therefore concludes that an utterance such as (34) is used by the speaker to perform two distinct acts of communication. On the one hand, the speaker is communicating the information that he was unaware of the crisis (base proposition), while on the other hand, he is admitting that the base proposition is true. Crucially, Blakemore claims that the main relevance of an utterance such as (34) is achieved on the level of the embedded proposition: it is the information that the President was unaware of the crisis that will cause the main bulk of cognitive effects; the second act of communication (i.e. the act of admitting) achieves its relevance by helping the hearer process the first act. Therefore, the performative verb functions as a

[14] Naturally, if there is some doubt as to how the hearer is to process the utterance, a speaker aiming at optimal relevance could stipulate explicitly that a prediction is being made - for instance, by using a 'non-communicated' performative such as *I predict, I suggest, I hypothesise, I guess, I conclude,* etc. Since predicting, suggesting, etc., do not rely for their use and comprehension on institutional facts (unlike baptising, blessing, etc.), they belong to *non-institutional* non-communicated acts (Sperber and Wilson 1984: 10ff.).

kind of conceptual constraint on the way the relevance of the embedded proposition is to be computed.

We now have the machinery with which to reconsider the role of epistemic modality in communication and to reformulate the parallel with the two classes of expressions above. I want to argue that epistemic modals bear some similarities to the class of evidentials and parentheticals in that both classes introduce metacognitive operations. Furthermore, I want to propose that epistemic modal verbs resemble non-communicated performatives in that both classes contribute to the truth-conditional content of the utterance, even though they give rise to a 'layered proposition'. The following section is devoted to substantiating these claims.

3.2.3 Metarepresentation and truth conditions

Recall example (30), repeated below as (36):

(36) The prices in the restaurants overlooking the river must be the highest in town.

I suggest that the proposition expressed by (36) has the complex form in (36'):

(36') It is entailed by the set of all of the speaker's beliefs that $_{p}$[[the prices in the restaurants overlooking the river are the highest in town]].

I have introduced double square brackets in (36') to highlight the fact that the embedded proposition p is metarepresentational, since at this stage in the discussion this property of p is going to be critical. Consider now how the hearer will process (36'). It is possible that this complex proposition will be capable of causing some cognitive effects as it stands. Imagine, however, that (36') fails to interact with existing contextual assumptions to yield adequate cognitive effects. The hearer is then entitled to temporarily detach p from the metarepresentational environment in which it appears, and process it on its own. The proposition in (36') will consequently be analysed into the two components in (37):

(37) a. The prices in the restaurants overlooking the river are the highest in town.

b. The proposition in (a) is entailed by the set of all the speaker's beliefs.

The hearer can now arrive at a range of cognitive effects by combining (37a) with other assumptions available to him: he might draw some conclusions as to the type of restaurants, their clientele, whether he might be able to eat there himself, and so on. The role of (37b) will be to adjust the level of support each of these conclusions finally receives by indicating the strength of one of their premises (the proposition in (37a)).

Such temporary disquotations of metarepresentational material seem to be quite regular thought processes: they are formal procedures which operate on well-formed propositional forms. Some further examples are given in (38) (see Sperber 1997 for discussion):

(38) a. Fodor believes that simple concepts are innate.

b. They say that it's better to be safe than sorry.

c. I hear that he is still abroad.

To take just one case: after detaching the embedded proposition in (38a) and processing it together with the assumption in (39a), the hearer may re-embed the product of this process under the initial metarepresentational environment and produce (39b):

(39) a. ELECTRON is a simple concept.

b. Fodor believes that ELECTRON is innate.

Going back to modality, it appears that epistemic modal verbs do contribute to the truth-conditional content of the utterance; however, it often turns out that the complex proposition to which they give rise cannot achieve relevance as it stands. The hearer, therefore, has to temporarily detach the embedded proposition and process it on its own in order to derive the main bulk of cognitive effects which the utterance was intended to create; this is done in accordance with the much more general process of

disquoting propositions from metarepresentational environments in the language of thought and processing them independently in a temporary inferential space. After a satisfactory range of cognitive effects has been reached, the contribution of the epistemic modal verb is to modulate these effects according to the degree of support which the speaker's belief-set assigns to the proposition originally embedded under the modal.

On this picture, the truth-conditional import of epistemic modals is kept separate from their contribution to the (main) relevance of the utterance. Mixed intuitions about the role of epistemic modals can now be explained as a result of confusion between these two aspects. On the one hand, as I have already mentioned, one should in principle try to give an analysis of epistemic modals that is symmetrical to that of root modals (unless there are strong reasons to the contrary); the above solution indeed preserves the 'symmetry of enrichment' intuition. Furthermore, it is often felt that the content of an epistemically modalised utterance is not falsified by an outcome which falsifies the proposition embedded under the modal; this is now explained by the fact that the speaker in an utterance such as (36) is simply committed to the truthfulness/factuality of the complex proposition in (36') - and not the truthfulness/factuality of the embedded proposition p. A genuine falsification of the proposition expressed by (36) would be (among other things) the discovery of a counterexample to p which the speaker manifestly knows but which she has overlooked in evaluating p. On the other hand, the proposed account of epistemic modality captures the intuition underlying previous analyses that epistemic modal verbs make a comment on a (base) proposition, or an indication of speaker commitment: however, this is taken to be not an intuition about truth conditions, but about the function of epistemic modals in establishing the relevance of the overall utterance.

It is clear that epistemic modal verbs, on the disquotational account I propose here, bear various similarities to the class of performative verbs analysed by Blakemore (1990/1). Performative verbs such as *I conclude, I infer, I predict*, and so on, in their syntactically non-parenthetical uses, regularly contribute to the truth-conditional content of the utterance; however, they do not participate in the computation of the main relevance of the utterance but are used to regulate in a specific way the bulk of cognitive effects which the main (base) proposition achieves. In (40), for instance, the

contribution of the main verbs to the relevance of the utterance depends on the prior computation of the range of effects which the proposition in (41) yields in each case:[15]

(40) a. I conclude that the Earth is flat.
b. I infer that the Earth is flat.
c. I insist that the Earth is flat.
d. I suggest that the Earth is flat.

(41) The Earth is flat.

So far, so good. However, we still lack an explanation of the fact that epistemic modals do not satisfy the normal tests for truth conditionality. I want next to claim that, far from being surprising, the behaviour of epistemic modals with respect to these tests is, in fact, to be expected. As a reminder, I repeat below the examples in (23) - (26), which were taken as prima facie evidence for the non-truth-conditionality of epistemic modal verbs:

(42) Alfred must be secretly seeing Barbara.

(43) a. ?Is that so? (= Is it the case that A. must be secretly seeing B.?)
b. ?I don't believe it. (= I don't believe that A. must be secretely seeing B.)
c. ?I agree. (= I agree that A. must be secretly seeing B.)
d. ?It is surprising that Alfred must be secretly seeing Barbara.
e. ?Mary told us that Alfred must be secretly seeing Barbara.
(other than reported speech)

(44) The area must be evacuated.

(45) a. Is that so? (= Is it the case that the area must be evacuated?)
b. I don't believe it. (= I don't believe that the area must be evacuated)
c. I agree. (= I agree that the area must be evacuated)

[15] One could speculate at this point about what triggers the 'layered proposition' effect in the case of non-communicated performatives: it could be that verbs such as *I conclude, I suggest*, etc. are also metarepresentational environments, so that the double-level analysis marks the disquotation of the embedded representations. Another consideration is the syntactic partitioning of the utterances in (40) into main (performative) verb and complement. Blakemore's suggestion about 'multiple acts of communication' takes a somehow different perspective on these issues.

d. It is surprising that the area must be evacuated.

e. Mary told us that the area must be evacuated.
(other than reported speech)

It seems to me that the impossibility of getting responses such as (43a-d) to the epistemic (42) can be straightforwardly explained within the framework I have developed. It is reasonable to assume that, in each of these responses, the speaker is reacting to the main point made by the previous utterance. In accordance with what was claimed earlier, the main point of (42) is the embedded proposition [Alfred is secretly seeing Barbara] - therefore, this is what the speaker's doubt, disbelief, agreement or surprise picks out. In the root example, by contrast, the modal verb forms part of the main predication and therefore makes a contribution to the main relevance of the utterance: as a result, the responses in (45a-d) are acceptable.

(43e) is more complicated. Recall that the complex proposition expressed by an epistemically modalised utterance makes reference to the speaker's belief-set (see, e.g., clause (37b) above). This introduces an element of indexicality into the representation: modal verbs like *must, may, should,* and so on, on their epistemic interpretations, involve the evaluation of a proposition with respect to the current belief-set of the speaker in the here-and-now of the talk-exchange. This property of epistemic modality is responsible for the unacceptability of (43e): barring verbatim reported speech and full mention in general, (43e) is ill-formed because it is impossible to use *must* to refer to Mary's original epistemic evaluation of the embedded proposition - the verb will default to the current speaker and her present evaluation of whether Alfred is secretly seeing Barbara. No such property inheres in the root interpretation of (44), so that the response in (45e) is perfectly well-formed.

The 'indexicality' of epistemic modals is also responsible for their inability to fall under the scope of conditionals. Recall the previous examples:

(46) a. ?If John must have a high IQ, then his teachers should treat him carefully.

b. ?If that blonde may be Jack's wife, we should keep quiet about the secretary.

(47) a. If John must leave, then I will leave too.

b. If money may rule, then there's no justice.

In (46), *must* and *may* are used for the on-line performance of an inference on the part of the speaker: as such, their content cannot be placed in the antecedent of a conditional. Take (46a): it is difficult to see what conclusion could follow from the fact (roughly) that the speaker's beliefs entail that John has a high IQ. On a possible reformulation of (46a), after omission of the modal, only the content of the embedded proposition falls under the scope of the conditional - and the result is a well-formed utterance. Root modals can unproblematically contribute their conceptual content to an *if*-clause, as (47) shows.

On this analysis, then, the alleged diagnostics for truth conditionality do not in this case, in fact, test for contribution to truth conditions; at most what they pick out is the 'main point' of the utterance. A further argument to this effect is that non-communicated performatives, which do contribute to the truth-conditional content of the utterance, also resist falling within the scope of the conditional. Notice that (by definition) performatives are tied to the here-and-now of the utterance and, rather than describing a certain state of affairs, they mostly contribute to relevance by fine-tuning the interpretation of the proposition embedded under them:

(48) a. ?If I conclude that the Earth is flat, then I shouldn't like to go beyond San Francisco in case I fall off.

b. ?If I insist that the Earth is flat, then I shouldn't like to go beyond San Francisco in case I fall off.

If the parallel between epistemic modals and a certain type of performatives is close enough, some other parallels drawn in previous analyses of modality will have to be reconsidered. I have in mind primarily the connection with various parenthetical expressions, notably verbs and adverbials. On the analysis I have presented here, there are syntactic reasons for keeping the class of parentheticals distinct from that of modal verbs. Parenthetical elements, being only loosely attached to the base clause, cannot be taken to contribute to the (main) proposition expressed by the utterance; their role is to

contribute to higher-level explicatures which fine-tune the comprehension of the main propositional content of the utterance. Consider the following examples:

(49) a. According to Fodor, simple concepts are innate.
b. As people say, it's better to be safe than sorry.
c. He is still abroad, I hear.

(50) a. The Earth, I conclude, is flat.
b. The Earth, I infer, is flat.
c. The Earth, I insist, is flat.
d. The Earth, I suggest, is flat.

(49) is a parenthetical version of (38) and (50) a parenthetical version of (40). By way of illustration, I give the proposition expressed by (49a) and (50a) together with the higher-level explicatures which the utterances communicate:

(51) a. Simple concepts are innate.
b. According to Fodor, (a).

(52) a. The Earth is flat.
b. The speaker concludes that (a).

As (51b) and (52b) are meant to show, higher-level explicatures are themselves metarepresentations. The difference from the non-parenthetical versions of these examples is that, in (49) and (50), the presence of a double-level utterance is made structurally transparent: two claims are being made by each member of (49) or (50), each with its own separate truth conditions, and only one of them contributes to the main truth-conditional content of the utterance. By contrast, in epistemic modals (and, arguably, non-parenthetical performatives), the speaker is committed to the truth of a complex claim, which is subsequently analysed into a double-level proposition (the proposition expressed by the utterance).

The distinction carries over to evidential and hearsay adverbials. Without going into much detail, I propose to generalise to the broader class of evidential markers the idea - already put forth for hearsay items - that these markers introduce interpretively

used propositions. If evidentiality involves an appreciation of the validity and source of information, it should rest on the human ability to handle mental representations of external reality *qua representations,* and to focus on properties of their representing dimension. It follows that all of the arguments I have adduced for treating epistemic modality as metarepresentational apply automatically to the broader category of evidentiality (see also chapter 4).

Still, evidential adverbials such as *obviously, clearly, apparently,* etc., and hearsay adverbials such as *allegedly, reportedly,* etc., make a very different contribution to what is conveyed by an utterance from epistemic modals. Extending proposals by Ifantidou (1994),[16] we can view the two classes of adverbials as setting up a metarepresentation (captured by a higher-level explicature in the relevance-theoretic framework): the type of metarepresentational environment (i.e. the specific type of adverbial) will fine-tune the interpretation of the ground-floor proposition (i.e. the proposition expressed by the utterance). Hence, even though both epistemic modals and evidential adverbials set up metarepresentations, they differ in that only the first contribute their content to the truth-conditional representation of the utterances containing them.

The point is a subtle one. Interestingly, it seems that my position on epistemic modals affords a number of correct predictions about the truth-conditional behaviour of modal expressions in general. Firstly, alethic or logical interpretations of modality, although they involve metarepresentation, should not cause truth-conditional difficulties, since they are not 'indexical' in the sense described above for epistemic modals. This prediction is confirmed by examples such as the following:

(53) If the sum of all angles in a triangle must be 180°, then my answer to the geometry exam is all wrong.

Secondly, modal adverbs such as *possibly, probably, necessarily,* etc., on their epistemic interpretations, should not contribute to the proposition expressed by the utterance. This prediction is borne out, since these adverbs fail the tests previously

[16] See also Blakemore (1994); her account does not apply the concept of metarepresentation to evidentials (hearsay items excluded).

used for epistemic modal verbs (see (54) - (55)); by contrast, on their root interpretations, they pass the tests unproblematically (see (56) - (57)):

(54) Alfred will possibly want to see Barbara again.

(55) a. ?Is that so? (= Is it the case that A. will possibly want to see B. again?)

b. ?I don't believe it. (= I don't believe that A. will possibly want to see B. again)

c. ?I agree. (= I agree that A. will possibly want to see B. again)

d. ?It is surprising that Alfred will possibly want to see B. again.

e. ?Mary told us that Alfred will possibly want to see B. again. (other than reported speech)

f. ?If Alfred possibly wants to see Barbara again, I don't know what will happen.

(56) The area will be necessarily evacuated.

(57) a. Is that so? (= Is it the case that the area will be necessarily evacuated?)

b. I don't believe it. (= I don't believe that the area will be necessarily evacuated)

c. I agree. (= I agree that the area will be necessarily evacuated)

d. It is surprising that the area will be necessarily evacuated.

e. Mary told us that the area will be necessarily evacuated. (other than reported speech)

f. If the area will be necessarily evacuated, then we should look for a new place to live.

Modal adjectives behave just like modal verbs in this respect; (58), epistemically interpreted, expresses a complex proposition of the sort in (58'), much as (36) above did (for further data, see Nuyts 1993):

(58) It is possible that Arsenal will win the cup.

(58') It is compatible with the set of all of the speaker's beliefs that [[Arsenal will win the cup]].

Finally, alleged counterexamples to the proposed account can be reanalysed away quite straightforwardly. For instance, certain so-called epistemic uses of modal expressions which appear in environments where genuine epistemic uses are usually unacceptable, can and should be reinterpreted as root uses:

(59) If Paul may get drunk, I'm not coming to the party.

(60) a. Paul will be the one who gets a promotion.

b. Not necessarily: Judy has been working very hard lately.

In (59), the speaker is taken to communicate that she is not coming to the party on the condition that there is an objective possibility that Paul will get drunk. This seems to suggest that we are, in effect, dealing here with a case of root modality. Indeed, in (59) the speaker does not make her coming to the party conditional on an epistemic relation, but on a factual, real-world possibility, supported by the circumstances in the world. (60b) is a second apparent counterexample to the view that epistemic modal adverbs do not contribute to the proposition expressed by the utterance and hence cannot scope under negation: nevertheless, I think *necessarily* should be given a logical, not an epistemic, reading here. What the speaker communicates by (60) is that there is another, logical rather than epistemic, possibility which the previous interlocutor has overlooked. Examples involving modal adverbs and adjectives could be multiplied, often exhibiting a notorious amount of idiosyncratic behaviour; since the main point of my argument concerns English modal verbs, I will not go into the properties of other modal expressions in any greater detail.

In conclusion, let me consider the implications of the discussion for the polysemy-monosemy debate. A standard argument for the claim that the root-epistemic distinction was encoded in the English modal system was that the distinction coincided with truth-conditional vs. non-truth-conditional aspects of communicated content. Semantic accounts based on a unitary analysis of root and epistemic modals had to face the objection that it was only root interpretations that regularly contributed to the proposition expressed by the utterance. The discussion in this section has offered some arguments for treating both types of modal interpretations as part of the basic truth-conditional content communicated by the utterance; moreover, the tests which claimed

to prove that epistemic modality was external to the proposition expressed were reanalysed mainly as diagnostics which pick out that part of the utterance which is responsible for the main bulk of cognitive effects (or the main relevance of the utterance). Consequently, the argument from truth conditions does not seem to lend any support to a polysemic organisation of the semantics of the modals.

3.3 'SPEECH-ACT' MODALITY

3.3.1 The proposal

I now want to turn to a different area which might be thought to pose a challenge to semantic and pragmatic accounts of modality: the category of 'speech-act modality'. The term belongs to Eve Sweetser (1990), who introduces the new category as an extension of her basic polysemy-based account of English modals.

Recall that, on Sweetser's analysis, modals encode force-dynamic concepts which are metaphorically projected from the concrete, external world of socio-physical experience to the abstract, internal world of reasoning and of mental processes in general. Force-dynamic notions applied to the external world give rise to root modals, and epistemic modals are the counterparts of these concepts in the abstract world of mental processes. The category of speech-act modality is then introduced as a further mapping of force dynamics, this time into the domain of speech acts, as the following examples are meant to illustrate:

(61) He may be a university professor, but he sure is dumb.
(62) There may be a six-pack in the fridge, but we have work to do.

Sweetser observes that what the speaker wants to convey by (61) is something like 'I admit that he is a university professor, and I nonetheless insist that he is dumb'; similarly in (62) the speaker is responding to an offer previously made by her interlocutor by communicating something like 'I acknowledge your offer, and I nonetheless refuse it'. These readings are contrasted with the interpretations of (63) and (64), where *may* carries normal epistemic meaning (Sweetser 1990: 70):

(63) He may be a university professor, but I doubt it because he is so dumb.

(64) There may be a six-pack in the fridge, but I'm not sure because Joe had friends over last night.

Sweetser concludes that modality in (61) and (62) is applied not to the content world or the epistemic world but to the conversational world: 'the interlocutor is being *allowed* by the speaker to treat a certain statement as appropriate or reasonable, or to present an offer' (ibid. p.71); therefore, the two utterances can be paraphrased as follows:

(61') I do not bar from our (joint) conversational world the statement that he is a university professor, but...

(62') I do not bar from our conversational world your offer of beer, but...

So speech-act modality is the result of applying the modal concepts to the conversational interaction itself: 'the speaker (or people in general) is forced to, or (not) barred from, *saying* what the sentence says' (ibid. p.73). Although it is more difficult to find examples parallel to (61) and (62) using other modals, Sweetser mentions some more cases which seem to involve all of the modals quite regularly:

(65) Editor to journalist:
OK, Peking can be Beijing: but you can't use 'Praha' for Prague.

(66) Mondale advisor giving directions to speech writer:
Reagan must be a nice guy (as far as the content of the speech is concerned), even if we criticise his policies.

(67) To smoker of long cigarette, from speaker who recognises that 'cigar' dialectally signifies 'long cigarette':
In New Orleans, you would be smoking a cigar right now.

The main reason for introducing speech-act modality into a model which so far includes root and epistemic meanings lies with Sweetser's conviction that 'an utterance is content, epistemic object and speech act all at once' (ibid. p.75). Therefore, linguistic

meaning may be grounded in any of the three conceptual domains of real-world (:content), epistemic and speech-act objects. Very often, a single meaning starts out from the more basic, real-world domain and ends up having counterparts in the other two domains. The same sort of polysemic structure is detected by Sweetser in conjunctions, conditionals, and other areas of natural language (on the idea of cross-domain mappings, see Fauconnier 1985, 1997).

In the sections to follow, I am going to argue that the phenomena classified as speech-act modality do not belong to a separate category and do not lead to any interesting generalisations about modality. Section 3.3.2 discusses the shortcomings of Sweetser's analysis. Sections 3.3.3 and 3.3.4 offer a reanalyis of Sweetser's examples using the notion of metarepresentation. Section 3.3.5 draws some conclusions about the metarepresentational use of logical operators in general.

3.3.2 Some problems

Sweetser recognises that her account of speech-act modality needs further refinement, and acknowledges a number of problematic - or, at least, puzzling - points in her scheme. First, it seems that it is not easy to find examples parallel to the ones in (61) and (62) using other modals. What is more, *may* cannot be used freely in utterances like (65)-(67): for instance, it gives strange results if substituted for *can* in (65). The explanation Sweetser puts forward is that *may* has been specialised for the sort of use exemplified in (61)-(62). This is a proposal very similar to that found in Fillmore, Kay and O'Connor (1988), who view utterances such as (61) and (62) as cases of *constructions*: 'clusters of information including, simultaneously, morphosyntactic patterns, semantic interpretation principles to which these are dedicated, and, in many cases, specific pragmatic functions in whose service they exist' (ibid. p.534). In a more recent discussion of examples like (61) within the framework of Construction Grammar, Paul Kay has maintained that the construction view can explain why, in (61), it is not *affirmed* that he *may* be a university professor (as it would if (61) were an epistemic statement), but rather it is *conceded* that he *is* a university professor; we could know everything else we know about the grammar and meaning of the words in

(61), Kay argues, without knowing that the utterance means something different from, say, an epistemic statement (Kay 1997: 51).

Both Sweetser's and Kay's approaches, then, have to attribute to the *may*-structures in (61) and (62) some degree of idiomaticity, in the sense that their interpretation cannot be predicted solely from the semantics of their separate parts. An account showing that the interpretation of the two examples follows quite naturally from their compositional semantics plus general pragmatic considerations would avoid the appeal to idiomaticity; for well-known reasons of semantic economy, such an account (if it could be made plausible) would be preferable on methodological grounds. One of my claims later on will be precisely that no construction-specific knowledge is necessary in order to derive the concessive overtones of these utterances.[17]

Another point acknowledged by Sweetser casts further doubt on the hypothesis that there is a separate, homogeneous category of speech-act modality: cases like (66) and (67) seem to involve a use/mention distinction, 'in that the speaker is applying the relevant modality to the choice of linguistic *form*, not to the content' (Sweetser 1990: 72).[18] However, Sweetser says, in utterances like (66) it is the *purport* of the speech which is in question, and so speech-act modality applies to the choice of a given content. One cannot help wondering whether there could be a single, more explanatory category which would encompass the uses in (61)-(67) and naturally allow for either content or form to fall under the scope of modality.

This raises a more general question as to the exact status of the 'speech-act domain' with respect to the semantics/pragmatics distinction. Sweetser clearly intends the content and epistemic domains to have a bearing on linguistic semantics; indeed, she says that some of the English modals actually encode both root and epistemic concepts. It is less clear that she should wish to extend this line to the speech-act domain. It certainly does not make much sense to claim that, say, *may encodes* speech-act modality, and Sweetser herself carefully avoids any such formulation. At best, then, one can speak of speech-act *uses* (rather than senses) of modal expressions. A

[17] This is not to say that there are no differences between Kay's and Sweetser's analyses (see Kay 1997: 51, fn.3).

[18] In a footnote, Sweetser leaves room for a separate subtype of speech-act modality to cover applications of modality to the form of the utterance (1990: 155); this would presumably cover examples (66) - (67), which she calls 'metalinguistic'. If my reanalysis of the 'speech-act' examples below is right, these uses are explicable in a natural way.

pragmatic extension of modality into the speech-act domain also seems to fit the parallel drawn by Sweetser between speech-act modality and metalinguistic negation (Horn 1985) - the latter, exemplified in (68), is widely recognised as a case of pragmatics-related phenomenon:

(68) I'm not his daughter; he's my father.

I will have more to say on the parallel in section 3.3.5. For the moment, I merely intend to point out that, even on Sweetser's analysis, speech-act modality has to be set apart from the root and epistemic cases in that it cannot be viewed as systematically generating polysemy in natural language.

There is one more argument to this effect. Sweetser suggests that her tripartite modal structure may be semantically analysed in terms of Fauconnier's theory of mental spaces (Fauconnier 1985): the content, epistemic and speech-act domains correspond to mental spaces, and a single root modal expression can have a counterpart in one of the other two spaces. Fauconnier's original conception of spaces was meant to capture referential 'ambiguities', which essentially stemmed from various ways of conceptualising a real-world referent: for instance, separate spaces were set up to deal with various mental representations of real-world referents (e.g. referents in pictures, or referents enmeshed in counterfactual situations). It is, therefore, quite easy to fit content and epistemic modality into this model: content modality would operate in the basic mental space which is used to represent real world entities and states of affairs, while epistemic modality would operate in a derived space which includes our mental representations of those entities or states of affairs (indeed Fauconnier discusses a number of epistemic expressions such as *in X's view*, *X believes that*, *according to X*, etc., which he considers 'space-builders').

However, mental space terminology does not apply as straightforwardly to speech-act modality. The question is: what would a mental space look like in this case? Most probably it would have to be a domain including descriptions of speech acts: the claim would then be that we conceptualise utterances as speech acts using a discrete speech-act mental space, so that modality operates on it. There are various problems with this thesis: for instance, there is independent motivation for doubting the necessity

of invariably assigning speech-act descriptions in the process of comprehension (Sperber and Wilson 1986/1995: 243). Moreover, even if there were a mental space for speech acts, it is implausible that the basic modal concepts of possibility and necesssity would coherently apply to it. Consider example (61): what the speaker conveys is not that a *speech act* is possible or admissible, but rather that the *content* of a statement is possible or admissible with respect to certain background assumptions. The same holds for the other utterances in (62)-(67). Note that Sweetser (1990: 74) considers certainty as the counterpart in the epistemic domain of compulsion in the real-world domain, and epistemic possibility as the counterpart of root possibility or permission: it is probably no coincidence that she avoids giving any example of counterparts in the speech-act domain.

A final problem for Sweetser's approach - and again one she points out herself (ibid. p.73) - is that speech-act uses of the modals have a relatively restricted range of interpretations. For instance, they generally do not refer to the speech act being performed by the speaker. Consequently, one could not use (69) to communicate (70):

(69) Your father must want you home.
(70) I must tell you that your father wants you home.

Moreover, only certain types of modality can be felicitously expressed towards the speech act being performed; although it is not rare to request permission, it is rare to assert it:

(71) May I ask you where you are going?
(72) ?I may ask you where you are going.

In the next section, I will propose a solution to these problems for Sweetser's approach; my main argument will be that speech-act modality is not a separate and natural class of phenomena but can be given a more plausible analysis in terms of concepts already independently motivated within relevance theory.

3.3.3 A reanalysis in terms of metarepresentation

Let me go back to the utterances in (61) and (62). A closer look reveals that they share a number of features:

a) They occur most naturally as rejoinders to a previous utterance, some aspect of which was disputed by the speaker but is now grudgingly conceded. For instance, (61) might be a follow-up to the clause in (73c) in an argument about Jones' abilities:

(73) a. X: I admire Jones immensely. I think he has contributed a lot to the intellectual life of this country.
b. Y: I don't agree at all. In fact, I think the guy is completely incompetent.
c. X: Look, he is a university professor.
d. Y: He may be a university professor, but he sure is dumb.

b) The special effects that such utterances are felt to achieve are lost if *but* (or some item signalling disagreement) is replaced by *and* in their second half; they are maintained, though, if the two clauses are merely juxtaposed:

(74) ?He may be a university professor, and he sure is dumb.
(75) He may be a university professor; he sure is dumb.

c) The modal typically bears contrastive stress, which seems to be crucial for the 'concessive' overtones of the utterance. Interestingly, if *may* is omitted, the utterance can still achieve more or less the same range of effects in case the main verb is assigned contrastive stress:

(76) He IS a university professor, but he sure is dumb.

d) The proposition in the second clause is a contradiction of a contextual implication of the proposition embedded under *may* in the first clause. In (73d), the proposition that Jones is dumb obviously contradicts the implication of the embedded proposition 'Jones is a university professor', namely that Jones is intelligent.

The above observations are meant to suggest that the special effects that utterances like (73) are felt to cause (concession being maybe the most prominent among them) are not due to any special semantic features of the modal verb but rather to the specific nature of the material embedded under the modal, together with independent contextual considerations. It is useful to point out in this connection that such uses are not specific to English but are also exhibited by modal verbs expressing possibility in other languages. In Modern Greek, for instance, the impersonal verb *bori* denoting possibility has uses exactly parallel to those of *may*:[19]

(77) Bori na ine kathigitis panepistimiou, alla
POSS be-3sing.pres.subj professor at university, but

ine anoitos.
be-3sing.pres.indic dumb-masc.

Here is how a pragmatic account of these uses would go. As far as I can see, there is an important generalisation to be made about so-called speech-act uses: the material in the scope of the modal is (wholly or partly) metarepresentational. More specifically, speech-act uses involve metarepresentations of either linguistic material (utterances or parts thereof), or conceptual material (thoughts or parts thereof) which is typically attributed to a source other than the speaker at the time of utterance. I have already introduced metacommunicative and metacognitive aspects of the human metarepresentational device in section 2.4.1. In the following paragraphs, I will discuss their properties at greater length and deal with certain terminological points before applying them to examples of 'speech-act' modality.

Consider what is involved in metarepresenting somebody else's utterances or thoughts (or, for that matter, our own utterances or thoughts): one representation is used to represent another representation (the original) which it resembles (thereby forming a second-order representation). In order for the metarepresentation to succeed, a certain degree of resemblance between the original representation and the metarepresented version of it has to be maintained. In metarepresenting propositional

[19] For some Modern Greek data, see Papafragou (1998b).

contents (either communicated or non-communicated thoughts), the content of one proposition can be used to represent the content of another proposition just in case they share a sufficient number of analytic or contextual implications (see Sperber and Wilson 1986/1995: 227ff.). In other words, metacognitive and metacommunicative activity are constrained by quite general conditions on representation by resemblance. Following Sperber and Wilson, I have called the metarepresentational use of propositions based on resemblance in content 'interpretive use' of propositions (cf. the discussion in 2.4.1).[20]

Interpretive use is contrasted with descriptive use, where a certain proposition is used as a truth-conditional description of a state of affairs in the world. Consider the examples:

(78) Mary: So what did John say?

(79) Peter: It is a lovely day for a walk.

Peter in (79) might be taken to be describing a state of affairs in the external world; more plausibly, though, he is interpretively representing the content of John's utterance. The proposition expressed by (79) is thus used to represent what John said, and can be assumed to bear some resemblance to the original statement made by him. Since the utterance is used interpretively, what is important is not the truthfulness of the representation conveyed but its faithfulness to the original (see Wilson and Sperber 1988b). Faithfulness is a matter of degree, so that metarepresentations can be more or less literal interpretations of the original propositional objects they are meant to represent.

The sort of interpretive use one may detect in (79) is not linguistically marked, and therefore rests wholly on the inferential side of communication. In other cases, interpretive use is lexically or grammatically indicated. Taking up the previous discussion in section 3.2, (80) is an example of overtly marked reported speech, where the metarepresentation is signalled by the adverbial *allegedly*:

[20] Apart from metacognitive and metacommunicative aspects, interpretive use also includes metalogical aspects; I am not concerned with these here (cf. sections 2.4.1, 2.4.3 and chapter 4).

(80) Allegedly, the Prime Minister will resign.

This is a case of *attributive* interpretive use, involving the attribution of a thought or utterance to some more or less specific source. This source may be indicated in very general terms, as in (80); it may be quite specifically indicated, as in (82a), or it may be linguistically unmarked, as in (82b):

(81) John: Flying will become more expensive.

(82) a. According to John, flying will become more expensive.

b. Flying will become more expensive, indeed!

Finally, on certain occasions, a metarepresentation is accompanied by an indication of the communicator's attitude towards the original representation: in (80), for instance, the speaker would often be seen as maintaining her distance from what the content of the metarepresented assumption conveys, whereas in (82b) the communicator may be seen as adopting an attitude of endorsement towards the metarepresented assumption. This subtype of attributive interpretive use of a proposition which includes expressions of attitude is called *echoic use* by Sperber and Wilson (1986/1995).

Apart from metarepresentations of propositional or conceptual content - utterances or thoughts - speakers may metarepresent aspects of linguistic form:

(83) On page 10, 'book' should be underlined.

Here, the speaker uses a linguistic stimulus to represent the form, rather than the content, of another linguistic stimulus. Linguistic metarepresentations which involve form instead of content are called *metalinguistic*. Together with the varieties of interpretive use (metacommunicative, metalogical and metacognitive), metalinguistic uses span the spectrum of metarepresentation in humans.[21]

[21] This is not always the use reserved for the term 'metalinguistic' by most of the recent pragmatic literature (see Horn 1985, Sweetser 1990, Carston 1998; cf. previous footnote).

On this account, cases of mention fall squarely within metalinguistic uses of language. When mention is accompanied by the expression of the speaker's attitude, metalinguistic uses are echoic in a way parallel to the interpretive echoic uses:

(84) Johnny saw two 'mongeese'; somebody ought to tell him that the correct plural is 'mongooses'.

In the first clause of (84) the communicator metarepresents the specific linguistic form used by a previous speaker (a fact that can remain linguistically unmarked in spoken interaction) and (implicitly) adopts an attitude of rejection towards it; the second part of the utterance includes an explicit metalinguistic representation of form together with its explicit endorsement by the speaker, and thus functions as a sort of corrective statement with respect to the first clause.

We can now return to the examples of 'speech act' modality. It is fairly easy to see that the material embedded under *may* in (61) is metarepresentatively used: as I showed, the utterance is felicitously used as a rejoinder to a previous utterance, which made the point that Jones is a university professor. Since the metarepresentative use here involves the content and not the form of the utterance, it is a case of attributive interpretive use; this is not overtly signalled by any linguistic device, but is quite directly retrievable by virtue of the immediate juxtaposition of the two utterances in interaction.[22] The same holds for the example in (62). What about the speaker's attitude toward the metarepresented content? I would suggest that (61) and (62) are not clear cases of echoic use, since there is no single communicated attitude towards the interpretively used material. On a first pass, it might seem that the speaker adopts an attitude of endorsement. However, she hastens to add that she disagrees with an easily accessible implication of the interpretively used content, which the initial utterance aimed at communicating: in (61) this is the implication that Jones, being a university professor, is intelligent; in (62) it is the implication that the interlocutors should have some beer.

[22] Of course, the interpretive use may be explicitly indicated, as in (i):

(i) He may be a university professor, as you say, but he sure is dumb.

The implication-denying aim of the second clause is bolstered by the existence of *but*. As Diane Blakemore has shown, this conjunct functions as a constraint on the implicatures of the utterance containing it: more concretely, it indicates that the proposition it introduces is meant to achieve relevance as a denial of expectation (Blakemore 1989). In both (61) and (62), the second clause indeed contradicts and eliminates a highly accessible implication of the (interpretively used) content of the first clause. This is the reason for the awkwardness of (74): *and*, even after pragmatic enrichment, cannot achieve the same effects as *but*. However, a non-conjoined juxtaposition of the two clauses may convey effects quite similar to those achieved by the presence of *but*, as the example in (75) demonstrates: the reason is that the hearer can inferentially work out the contrast between what is communicated by the material embedded under *may* in the first clause and the proposition expressed by the second clause - in other words, he can pragmatically supply the instruction which *but* encoded as to the direction in which the relevance of the second clause is to be sought.

On the present analysis, then, *may* in (61) and (62) has its normal epistemic interpretation. Its complement is an assumption which is derived by deliberate inferencing, and as such has come to belong to the speaker's 'belief-box' with a degree of strength attached to it. What is typical of so-called speech-act examples such as (61) and (62) is simply that the assumption in the complement of the modal has been picked up from the interlocutor's previous contribution to the exchange, evaluated and formed the output of the usual inferential computation of epistemic possibility.

The move of reducing speech-act modality in (61) and (62) to a subcase of ordinary epistemic modality has a number of advantages. For instance, it allows for the fact that very often the speaker chooses to modify her utterance with *may*, although she manifestly possesses enough evidence for the truth of the embedded proposition. In (61), the fact that Jones is a university professor is undisputed, so that (76) would actually be more appropriate given the speaker's current beliefs. By using epistemic *may* - i.e. by indicating that further evidence could conceivably bear on the truth of the embedded proposition, but that such evidence is unavailable to her at present - the speaker communicates less than what she manifestly knows. Therefore, she conveys that she does not want to commit herself to the whole array of cognitive effects the stronger proposition in (76) would produce. This strengthens the conclusion that the

speaker does not subscribe to the contextual implication that Jones is intelligent. Moreover, the understatement gives rise to the implication that the speaker grants a point to the addressee now but reserves the right to dispute it later.

It may be objected here that, on my account, the speaker does not actually communicate in any strong sense that Jones *is* a university professor in (61). This goes against the intuitions of many speakers, and is explicitly argued against in Kay (1997). I have two lines of response to such an objection. To begin with, I do not think these intuitions are particularly decisive. For instance, they seem to rely heavily on the presence of *but*; compare (85a) to (85b):

(85) a. The minister may want to support research, but the funding is scarce.
b. The minister may want to support research; still, the funding is scarce.

More generally, it seems that the degree of speaker commitment to the complement of the modal depends on contextual assumptions, and cannot be derived in a purely structure-driven way. This is supported by the fact that there is a range of related uses of *may* which, although carrying concessive overtones, lack (at least on one of their readings) a speaker commitment to the complement of the modal:

(86) a. Harry may be a genius; I don't care. I never liked him.
b. The story of her life may be very sad - but I'm not interested in that. It's her work as an artist that I'm interested in.
c. He may be a university professor - but then again he may not; in any case, he's dumb.
d. This allegation may well be true, but it does not affect the rights of the defendant.

Roughly, the examples in (86) involve an *even if* type of concession rather than an *even though* type; in different terms, the speaker raises one possibility only to convey that it does not affect the main point she wants to communicate. In some of the utterances in (86) (e.g. (d)), it is difficult to distinguish between the 'speech act' and a pure epistemic

reading for the modal. This emerges more clearly in (87c), where the speaker is in no way committed to the sculpture being a masterpiece:

(87) a. X: I hate modern art. Look at this: what is it supposed to mean?

b. Y: Well, this sculpture is famous. It was the winner in the Royal Academy contest last summer.

c. X: It may be the masterpiece of the century, but I still don't understand it.[23]

How then are we to explain the various types of concession ranging from the strong variety in (61) to the weak version of (87)? Assuming that *may* has its usual epistemic interpretation throughout, it appears that the degree of speaker commitment to the complement of the modal (and hence, the degree of concession) will be pragmatically inferred. Generally, as I have suggested above, the presence of *but* encourages 'strong commitment' interpretations. In (61), by introducing the denial of an implicature of the complement of *may*, the presence of *but* supports the conclusion that the speaker actually subscribes to the truth of the complement ('Jones is a university professor') in the first place - and, therefore, grants a point to the addressee, who previously put forth a version of the complement. Another factor affecting the type of concession communicated is the resemblance between the original utterance or thought and its interpretive representation in the complement of *may*. In (87c), for instance, the complement of *may* is a less-than-literal interpretation of the original utterance of Y, and in fact an exaggeration;[24] rather than genuinely granting that the sculpture is a masterpiece, X communicates that, even if it is, he still denies that it is understood and recognised as such (which is a strong implication of the assumption that it is the masterpiece of the century). In fact, what (87c) communicates can be paraphrased as in (88):

[23] One can also get conjunction-reduction on the two different interpretations of *may* (as Deirdre Wilson has pointed out to me):

(i) It may be famous, or indeed the masterpiece of the century, but...

[24] On exaggeration as a variety of representation by resemblance, see Sperber and Wilson (1989).

(88) It is possible that it is the masterpiece of the century (although I doubt it), but I still don't understand it.

Yet a further advantage of considering speech-act modality as a subcategory of epistemic modality is that one can explain why *may* seems to have a privileged distribution in 'speech-act' examples over other modals - most notably, *can*. According to my semantic proposal in chapter 2, *can* encodes the information that the assumption in its complement (let us call it p) is compatible with the set of all factual assumptions that bear on its truth; on this analysis, *can* lacks epistemic interpetations. However, all concessive examples such as (61) and (62) appear to involve the speaker's admission that a certain assumption is not ruled out by her current knowledge - rather than by the state of affairs in the world. Furthermore, *may* is naturally suited to 'concessive' examples, where the speaker temporarily grants a point while at the same time reserving the right to reject it later (as is especially the case in utterances such as (87)). This is so because changes in epistemic states are to be expected, so that what may now seem epistemically possible can in the future be disproved by further evidence (and vice versa). *Can* differs from epistemic *may*, in that no further assumptions entailing the negation of p (i.e. assumptions incompatible with p) can be uncovered in the future - hence the infelicity of *can* in the concessive examples of this section.

3.3.4 Further examples

If the reanalysis of speech-act modality in terms of metarepresentations is essentially correct, then it should allow us to provide a unified account of a quite wide range of examples. On Sperber and Wilson's approach, what can be interpretively represented may vary from actual utterances of previous discourse to implied propositions or unuttered thoughts, hopes, etc., and from fully propositional forms to individual concepts; furthermore, as I have already remarked with respect to example (87) above, the degree of faithfulness to the original proposition may range from total identity to weak resemblance. Let me explore some of these possibilities. Imagine that Peter and Mary are getting ready to go home after a party and the following dialogue takes place:

(89) a. Mary (to Peter): Give me the car keys. You are drunk.

b. Mary (to Peter): Give me the car keys. You are in no position to drive.

c. Mary (to Peter): Give me the car keys. You'll have an accident.

d. Mary gives Peter a worried look as he approaches the driver's door.

(90) Peter: I may be drunk, but I know what I am doing.

Peter's reply in (90) places within the scope of *may* conceptual material which has become available in the previous stage of his exchange with Mary. Offered as a response to (89a), Peter's utterance clearly interpretively represents a stretch of speech produced by Mary, and does so verbatim: in relevance-theoretic terms, it is a fully literal metarepresentation of the original utterance. If (90) is a reply to (89b), the material embedded under *may* bears a lower degree of faithfulness to the metarepresented utterance: in other words, it offers a less-than-literal interpretation of the proposition expressed by the second utterance of (89b), although it shares with the latter a number of logical and contextual implications (for instance, that Peter is in a bad condition, that he has no full control of himself, etc.). If taken together with (89c), (90) will be taken to interpretively represent a highly accessible contextual implication of Mary's second utterance ('You'll have an accident') - in particular, an implicated conclusion which Peter has derived in order to establish the relevance of Mary's comment. Finally, Peter may choose to interpretively represent an unuttered thought of Mary's, which he has reconstructed from the stimulus in (89d) - independently of whether the stimulus itself was ostensive or not; by interpretively representing Mary's thought Peter communicates that he has somehow retrieved it and wants to convey his attitude to it (as well as to one of its manifest implications).

Let me extend the analysis to some of Sweetser's earlier examples, repeated below for convenience:

(91) Editor to journalist:

OK, Peking can be Beijing: but you can't use 'Praha' for Prague.

(92) Mondale advisor giving directions to speech writer:

Reagan must be a nice guy (as far as the content of the speech is concerned), even if we criticise his policies.

(93) To smoker of long cigarette, from speaker who recognises that 'cigar' dialectally signifies 'long cigarette':
In New Orleans, you would be smoking a cigar right now.

Recall that metarepresentation may focus on aspects of linguistic form as well as aspects of content. I want to claim that, far from warranting the postulation of a separate kind of modality, these examples simply contain metarepresentations of form. In (91), for instance, given certain pragmatic considerations, such as the authority relationship of the editor to the journalist, *can* is ascribed its usual permission-granting interpretation. *Beijing* is here used metalinguistically: the speaker is 'holding up' a term which (in all probability) was previously proposed by her interlocutor, and concedes its appropriateness for the identification of Peking. The proposition expressed by the initial utterance of (91) assumes roughly this form:

(91') Peking can be (appropriately) called 'Beijing'.

The existence of metalinguistic use is further supported by the overtly quotational use of *'Praha'* which follows. An identical analysis can be proposed for (93): the indefinite description *a cigar* is being used metalinguistically. The speaker refers back to a linguistic form which would have been considered suitable for picking out a specific object in a different dialect (that of New Orleans). In these examples one might further assume that the descriptions are used not only metalinguistically, but also echoically, since the speaker expresses an attitude towards their appropriateness to pick out specific referents. This line of analysis justifies Sweetser's feeling that there is something 'metalinguistic' about these examples, and that they are possibly connected to the use/mention distinction; moreover, it goes one step further than mere intuition and accommodates cases like (91) and (93) to the metarepresentation of content I have examined above.

The case of (92) is slightly more complicated. On a first pass, it has to be set apart from (91) and (93) in that it involves no mention of linguistic form. What is distinctive about this example is the use of the proper name *Reagan* to refer not to the individual who used to be President of the United States but to a representation of that

individual as it emerges from a text (here, a speech). Such uses of names and descriptions have attracted some attention in the linguistic literature; there it is standardly assumed that 'real-world' referents are linked to their representations in images, pictures, photographs, etc. via 'pragmatic connectors', so that the natural way of talking about representations of a referent is by using the term for the referent itself (Nunberg 1978, 1979, Fauconnier 1985, 1997). In Fauconnier's theory of mental spaces, once a relation of the form 'x is a picture of y' is established through psychological perception, social convention, mode of production or some other means, then a local pragmatic connector is created to the effect that the term for y can be used to pick out the representation in x (Fauconnier 1985: 12). In a much earlier study, Jackendoff (1975) has noted that this phenomenon is a pervasive characteristic of natural language, and its explanation should be sought not in 'imprecision' or 'loose metaphor' but rather in 'the means the language has to refer to images in pictures'.

Elsewhere I have questioned both the theoretical motivation and the descriptive adequacy of the concept of pragmatic connectors (Papafragou 1995: 143ff.). For the moment, and without taking up the whole issue raised by pictorial representations and their linguistic expression, I would like to propose that (92) can be more profitably analysed using again the relevance-theoretic notion of representation by resemblance. Apart from whole propositional representations, isolated concepts can be held to enter into relations of representation by resemblance when they share logical or encyclopedic properties. Thus the concept REAGAN in (92) is used interpretively to refer to a representation of the concept's referent which is constructed out of assumptions included in a political speech. REAGAN, once used interpretively, no longer picks out an individual directly, but rather a description of an individual; even more accurately, an individual-as-object-of-description. Let's call the resulting concept REAGAN'. Of course, the new, ad hoc concept and the original concept for the individual resemble each other: after all, the derived concept has to maintain a reasonable degree of faithfulness to the parent concept if it is to be recognised as a representation of it in the first place. In addition to a common logical entry, the two concepts share a considerable part of their encyclopedic entry: for instance, a number (if not all) of the perceptual attributes for Reagan, as well as attributes concerning Reagan's personal

history.[25] Where REAGAN and REAGAN' presumably come apart is in those attributes which have to do with Reagan's political career and abilities. (92) explicitly conveys that REAGAN' must be a nice guy, even though Mondale's group criticises REAGAN's policies.[26]

This line of thought can be generalised to a broad range of cases where language is used to pick out pictorial or other representations. It seems that the possibility of using the term for a given referent to pick out a representation of that referent arises universally and spontaneously (Nunberg 1978, 1979). This fact provides further support for a pragmatic account based on a general human cognitive ability, such as the ability to form representations by resemblance. A full-blown pragmatic explanation should also be able to accommodate the variations in the sorts of representation or in degrees of faithfulness to the original concept, the possible attribution of the representation to a specific source (i.e. the creator of a work of art), etc.

This may well be so, one might think, but what does it have to do with the sort of modality employed in (92)? Absolutely nothing - which is what I set out to show. *Must* in (92) may receive either of two interpretations: on a regular root interpretation of the modal, the utterance expresses a necessity in view of the circumstances; bolstered by further contextual considerations (e.g. the authority relationship of the Mondale advisor to the speech writer), the root interpretation may develop into a deontic one, whereby the speaker will be taken to impose an obligation on the hearer. In either case, there is no room for a separate category of 'speech-act modality'. (92) thus serves to strengthen the conclusion which emerges from examining all of Sweetser's examples in this section: the class of speech-act modality is unified by the fact that modal operators may range over material which may be interpretively or metalinguistically used. This possibility, being a general pragmatic phenomenon, is not particularly linked to modality examples and leads to no interesting independent generalisations about their nature.

[25] I use 'attributes' for conceptual properties in the technical sense introduced by Barsalou (1992).
[26] Pronominal co-reference is not blocked by interpretive use (cf. *his policies* in (92), where *his* refers to real-world Reagan), although its acceptability may be influenced by a variety of pragmatic factors (see Fauconnier 1985, Papafragou 1995).

What appeared to be puzzling phenomena in Sweetser's analysis now cease to present any difficulties. Take first the observation that in utterances of the sort in (91)-(93) various modals seem to occur freely. An unrestricted distribution of modal verbs is exactly what one would expect if the occurrence of the interpreted/metalinguistic material is completely independent of the sort of modality involved, and is in fact a general pragmatic possibility. True, examples (91)-(93) are different from the other examples examined in this section. However, the reason is simply that they do not involve metarepresentation of the whole of the proposition embedded under the modal, but rather include metarepresentations of individual concepts (either as metalinguistic uses of form or as interpretations of content). This should not stand in the way of viewing all of the 'speech-act modality' examples as belonging to a unitary group marked by the presence of metarepresentations. Natural connections between the two groups in (61)-(62) and (91)-(93) are not difficult to find. For instance, whenever the metarepresented concept is attributed to a previous speaker and endorsed by the communicator, the utterance in (91) acquires concessive implications parallel to those communicated by (61) and (62).

It is equally unsurprising (*pace* Sweetser) that we cannot use a modal verb to modify an unexpressed description of the speech act performed by an utterance (e.g. an act of telling). What falls under the scope of the modal verb is the propositional content of the utterance embedded under the modal; although this content may be descriptively or non-descriptively used, there is no room for a development of its truth-conditional content that would include a speech-act description which would then be picked up by the modal operator. As for linguistically expressed speech-act descriptions, again they do not warrant the postulation of a special sort of modality. In a case like (70) - repeated below as (94) - *must* has its normal root interpretation; in other words it expresses a necessity in view of the circumstances:

(94) I must tell you that your father wants you home.

Quite apart from the issue of speech-act modality, Sweetser is right to point out the existence of restrictions on the co-occurrence of performatives and modals. But such restrictions can very often be predicted and explained on the basis of the cognitive

effects the speaker might have intended to achieve by her utterance. It is true, for instance, that it is strange to assert - rather than demand - permission as in (68), repeated in (95):

(95) ?I may ask you where you are going.

Imagine now the following situation. Peter, Mary's husband, is getting ready to go out after having had a big quarrel with his wife:

(96) a. Mary: Where are you going?
b. Peter: You don't expect me to answer that, do you?
c. Mary: I may ask you where you are going. After all, I'm still your wife.

What Mary conveys by her reply is that she is allowed to ask Peter where he is going. The reason (95) is more acceptable within the context in (96) has to do with the fact that it creates a range of cognitive effects, i.e. it is relevant in that context. Assume, for example, that Peter manifestly wants his independence and therefore it is against his desires and preferences that Mary knows whatever he does at any given moment. It is easily inferred from the second assumption that it is also against his desires and preferences that Mary asks him where he is going. Given these manifest assumptions, Mary's response in (96c) communicates that she does not take into account Peter's desires and preferences in assuming that she is allowed to ask him about his whereabouts. There are two conclusions to be drawn from this example. Firstly, no special kind of modality is needed for the comprehension of (95); if the utterance is placed in the context of (96), *may* receives a normal root interpretation, i.e. it is understood to convey permission. Secondly, and more generally, there are no hard-and-fast generalisations to be made with respect to the interaction between modals and performatives, since the acceptability of their combination within an utterance crucially depends on the way the utterance is intended to achieve relevance.

3.3.5 Metarepresentational uses of logical operators

Let me add a couple of final considerations which extend (and indirectly support) the proposed reanalysis of speech-act modality. Firstly, the notion of interpretive/metalinguistic use should provide us with a means of capturing similarities between modal and other logical operators in natural language which operate on metarepresented conceptual material. Recent work within relevance theory has furnished two candidates: metalinguistic negation and some non-basic uses of indicative conditionals. Consider the following examples:

(97) a. He isn't neurotic OR paranoid; he's both.
b. I haven't DEPRIVED you of my lecture on negation; I've SPARED you it.
c. She's not my mother; she's my female progenitor.
d. The President of New Zealand ISn't foolish; there IS no President of New Zealand.

(98) a. If you eat TOMEIDOUZ, you must be from America.
b. If the wine bottle is half-empty, you are a pessimist.
c. If two and eleven makes thirty, you need more work on maths.

(99) a. If you're thirsty, there's beer in the fridge.
b. If I can speak frankly, he doesn't have a chance.
c. If I may say so, you're looking particularly lovely tonight.
d. Grandma is feeling lousy, if I may put it that way.

(97) presents some typical cases of what Horn (1985) has called 'metalinguistic negation' (see also example (68) above). This sort of negation is taken as communicating an objection to some property other than truth-conditional semantic content: the insufficient strength of the lexical item used in (97a), a non-truth-conditional aspect of the semantics of a word in (97b), the stereotypic assumptions or connotations that come with a particular word in (97c), or an existential

'presupposition' carried by a sentence/utterance in (97d). Robyn Carston (to whom the examples and comments belong - see Carston 1994: 322) has suggested that the correct generalisation about the uses in (97) is that the normal truth-functional negation operator takes scope over implicitly echoic material. Similarly Eun-Ju Noh (1996), after examining some allegedly non-truth-functional uses of conditionals, has concluded that the truth-table account of indicative conditionals can be maintained if the antecedents in (98) and the consequents in (99) are construed metarepresentatively (i.e. interpretively or echoically). Although there are various kinds of metarepresented material and various degrees of faithfulness to the original source, what unifies the examples in (97)-(99) is the presence of metarepresented form or content of actual or possible utterances/thoughts (or subparts thereof).

An account which allows for the existence of interpreted/metalinguistic material in the scope of logical operators has the advantage of keeping constant the operators' semantic contribution to the proposition expressed by the utterance, while offering a purely pragmatic explanation for the behaviour of the operators in metarepresentative environments. The opposite solution would be to adopt what Horn (1985) has termed 'pragmatic ambiguity', or 'built-in duality of use' for the logical operators. This move has been explicitly or implicitly adopted by a number of writers; as we saw, it should be considered to underlie Sweetser's discussion at least with respect to 'speech-act' aspects of modality (since she takes the root-epistemic distinction to be semantically significant). However, as Carston (1994: 323) has remarked, what the 'pragmatic ambiguity' view entails is effectively a two-fold *semantic* ambiguity (see also Carston and Noh 1995). On the one hand, there is a linguistically encoded ambiguity in the logical operators themselves, which is often manifest in the discrepancy between truth-functional and non-truth-functional behaviour. On the other hand, there is ambiguity in the nature of the material which falls under the scope of the operators, whether it is a proposition or an utterance. This two-fold ambiguity thesis is unsatisfactory on two counts: first, it is counterintuitive to postulate ambiguities for the logical operators, and second, the thesis is based on an odd redundancy, an unnecessary multiplication of ambiguities. The conclusion offered by Carston and Noh (1995: 7) is that 'this representational ambiguity is not a linguistic ambiguity nor even a pragmatic ambiguity, though it is a pervasive feature of language use. It is one manifestation of a perfectly

general cognitive capacity of humans: the ability to metarepresent'.[27]

3.4 CONCLUDING REMARKS

In this chapter, I have taken issue with a range of arguments standardly used in support of (or in conjunction with) polysemy-based analyses of modality. Firstly, I showed that, claims to the contrary notwithstanding, the intended interpretation of a modal verb cannot be predicted solely on the basis of configurational properties but is inferred on the basis of broader contextual considerations together with distributional data. Secondly, I argued that epistemic interpretations of modals contribute in a regular way to the truth-conditional content of the utterance; however, I presented some independent reasons for the fact that epistemic modals do not normally satisfy tests for truth conditionality, such as embedding under logical connectives. Finally, I examined Sweetser's category of 'speech-act modality', which was introduced as a natural extension of the polysemic organisation of the semantics of modals into the speech-act domain. My conclusion was that, far from being independently motivated, the phenomena subsumed under this novel category are not a natural class; consequently, cases of speech-act modality should be reanalysed as cases of either root or epistemic modality.

The discussion of the truth-conditional aspect of epistemic modality has made it possible to speculate on a fourth argument standardly used to support polysemy accounts for modals (but also for other lexical items): the argument from the historical development of epistemic modal meanings/interpretations in expressions which originally expressed only root modality. The development of epistemic readings from root readings is assumed to be a diachronic semantic trend which indicates a rise in 'subjectification' in language (Traugott 1995). I want to suggest that the link between epistemic modality and metarepresentation can lead to an interesting reinterpretation of the findings from diachronic developments. The Appendix to this chapter is an attempt towards such a reinterpretation.

[27] The same argument can be extended to all declaratives which can be construed either descriptively or interpretively: on the ambiguity view, even an example like (79) would come out as (semantically/pragmatically) ambiguous.

Appendix 3A

Diachronic Evidence for the Root-Epistemic Distinction

According to what appears to be a robust cross-linguistic generalisation, epistemic modality historically developed from items which originally encoded other types of modal meaning (mostly volition, obligation and permission; see Bybee 1988a, 1988b, Bybee and Pagliuca 1985, Bybee, Perkins and Pagliuca 1994, Bybee and Fleischman 1995a, 1995b, Heine, Claudi and Hünnemeyer 1991). This development has been connected, as I mentioned in 3.2, with a shift towards greater subjectivity in language, or the process of subjectification in grammaticalisation - in other words, 'the development of a grammatically identifiable expression of speaker belief or speaker attitude to what is said' (Traugott 1995: 32; cf. Traugott 1982, 1988, 1989).

To take just a couple of examples with *must* (from Traugott 1989): epistemic interpretations of the (root) modal first appear in the environment of a strongly epistemic adverb, such as *nedes* ('without doubt'):

(1) 1385 Usk, Testament of Love (Skeat) 109, 90:
He that dooth good & doth not goodly ... must nedes be badde.
'Whoever does good, but does not do it with good intentions ... must necessarily be bad'.

It is not until the seventeenth century that *must* occurs with an epistemic meaning in the absence of the adverb:

(2) 1632 Middleton, Spanish Gipsie I, i.16:
the fruit muste be delicious, the tree being so beautiful.

Several specific mechanisms have been proposed for the emergence of epistemics. I have already argued against the plausibility of one of them, metaphor (Sweetser 1988; see section 2.1.2 and elsewhere). Another proposal includes generalisation, or semantic bleaching (Bybee and Pagliuca 1985, Bybee, Perkins and Pagliuca 1994): on this view, epistemic modal meanings are more abstract/general than root ones - a fact supported by the observation that, in English, epistemics normally have higher scope than root modals. Although this solution is consonant with the general tendency in grammaticalisation for loss of meaning, it is not clear that epistemic readings of modals are indeed more 'abstract' than root ones. Traditionally, bleaching is defined as loss of semantic features: a commonly cited example is that of the development of imperfective markers out of former progressive or habitual markers (Bybee and Pagliuca 1985). Epistemic interpretations of modals, however, involve more than simply subtracting semantic properties (e.g. agency) from root modal readings and, in this sense, they are different from classic cases of bleaching such as that of the imperfective. In different terms, it is not explained why generalisation in epistemicity coincides with a development of the speaker's attitude towards the proposition embedded under the modal. In this connection, the scope argument is not particularly helpful: sense generality is not guaranteed by wide scope.[1]

A third proposal invokes the conventionalisation of pragmatic inferences, or pragmatic strengthening (Traugott 1989). For instance, permission readings in modals can be used to implicate expectation: if I allow you to do something (the claim goes), I expect that you will do it. Similarly, obligation may be used to implicate expectation: 'If one says *You must go* in the meaning 'You ought to go', one can implicate that one believes/concludes that it is true that you have to go' (ibid. p.51). This pragmatic implication may then become grammaticalised and form part of modal semantics. Once the shift to epistemicity has been made, modal expressions can go on to acquire gradually stronger subjective overtones. However, I doubt that pragmatic strengthening can bring about epistemic interpretations, although it is definitely involved in other aspects of the historical development of the meanings of modals. The implication offered above for *You must go* does not really prepare the ground for the

[1] The fact that both root and epistemic *must* have wide scope militates against the association of scope with sense generality. Bybee, Perkins and Pagliuca (1994) attribute the development of epistemic *must* to metaphor, rather than bleaching.

shift from root to epistemic modal readings; *must* still has its normal root meaning (as shown by the paraphrase *have to*). Moreover, *pace* Traugott, obligation does not imply inferred certainty. Finally, *You must go* does not admit an epistemic reading; more generally, epistemic and root readings of modals do not normally appear in the same environments (cf. 3.1), so the former cannot arise through pragmatic implication from the latter.

I want to argue that the metarepresentational analysis of epistemic modality, together with a modified version of the semantic bleaching hypothesis, can provide a satisfactory account of the historical change in the meaning of modals. Assuming a tripartite semantics for modal verbs, the emergence of epistemicity in a class of former root expressions can be explained as a change in the type of admissible modal restrictor. In the first epistemic uses of *must*, for instance, the specification of a root modal domain was dropped, so that the verb could range over metarepresentational material (a proposition used interpretively, rather than descriptively). The novel, epistemic uses of the verb were licensed by the fact that a number of inferences were preserved from the original semantic entry: the modal relation (necessity) was maintained but now it held between a metarepresentational assumption (the embedded proposition) and the set of the speaker's beliefs. After repeated uses, the semantic entry of *must* was reorganised, so that the former root restrictor was replaced by an unspecified restrictor which had to be pragmatically filled in. The output of this process was a more general/impoverished semantic entry for *must*. This prediction is consonant with the semantic bleaching hypothesis, but not as I have presented it so far: generalisation does not obtain between the root and epistemic interpretations but characterises the relation between the initial, root reading and the final, indeterminate semantic entry for *must*.

On this account, the emergence of epistemicity in modal expressions is explained in two steps: firstly, the development of metarepresentational markers out of what were previously operators over descriptively used propositional material; secondly, the broadening/bleaching of the meaning encoded by former root modal items so that both root and epistemic interpretations can be derived on-line from an underlying semantic representation. This approach can be generalised to other modal verbs. In *should*, what has been described as a shift from 'weak obligation' to

'probability' can be explained as a shift in the normative restrictor encoded by the modal verb towards a metarepresentational domain. An interesting case is that of *may*, where the epistemic interpretation develops independently of the deontic (permission) interpretation (and indeed precedes it): both interpretations stem from the 'ability' meaning of the verb (Bybee 1988a, Bybee, Perkins and Pagliuca 1994). This can be accommodated by an explanation which allows for the replacement of former factual restrictors with non-factual (metarepresentational) ones; however, it would not be easily accommodated by an account which derives epistemic possibility from permission through the conventionalisation of implications (as Traugott 1989: 52 acknowledges), or through traditional bleaching.

A variety of linguistic items have followed a rather similar development: from contributing to the main explicature of the utterance (i.e. a conceptual representation which is responsible for the main bulk of cognitive effects caused by the utterance) these items have acquired uses which mark operations on the main explicature (thus contributing to non-basic or higher-order explicatures). Examples include the development of manner adverbs into evidentials (*clearly*, *obviously*) or illocutionary adverbs (*confidentially*, *frankly*), including 'stance' adverbs (*loosely*, *strictly*, *generally*). Not all of these items have identical properties synchronically, and all of them differ from modal verbs along a number of dimensions (see section 3.2); what unifies them is that they developed metarepresentational uses at some stage in their development.

This type of diachronic development does not exhaust the content of 'subjectification'. It does not generalise, for instance, to the following cases (mentioned by Traugott 1995): the development of the adversative/concessive out of the temporal connective *while*, the path from the imperative *let us* to the hortative *let's*, or the emergence of the 'preference' reading of *rather than* from a temporal reading ('sooner than'). But this is not necessarily an unwanted consequence, since it is not clear that 'subjectivity' applies uniformly to this larger class of linguistic items and constructions. Therefore, a metarepresentational account of the emergence of epistemicity (or 'subjectification') may be seen as a way of clarifying one aspect of what is essentially a term of convenience in historical linguistics.

This very brief discussion only touches on issues of diachronic modal semantics. I have mainly concentrated on the root-epistemic distinction with an eye to returning to the monosemy-polysemy debate on modality and reconsidering it in the light of historical evidence. Diachronic data have particular importance for polysemy analyses, since the presence of several secondary (historically older or newly emergent) lexical meanings is taken to point to a dynamic, cluster-like complex of encoded senses rather than to a unitary semantic address. In the case of the English modal verbs, the development of epistemics out of deontics is usually explained in semantic terms throughout. However, the directionality of historical change cannot be taken as evidence for the synchronic polysemy of modals for a number of reasons.[2] The first is that the directionality of historical change does not always coincide with the specific dependencies postulated by the synchronic analysis; I have in mind the case of *may*, where the epistemic reading historically precedes the deontic one. Secondly, and more crucially, the later appearance of epistemic interpretations of modal verbs does not exclude the possibility that, after an intermediate period of internal reorganisation, the semantic entry for modals underwent change towards a more general meaning (bleaching) which was capable of yielding a variety of contextual interpretations. Such a development presupposes that the semantic component operates in such a way as to maximise economy and avoid redundancy - an assumption which strikes me as reasonable. Instead of considering previously attested meanings as retained senses of a modal expression, this approach seeks to relegate to pragmatics the task of deriving the variety of modal interpretations in context. If this is right, then the overall diachronic precedence of root over epistemic meanings in modals does not straightforwardly translate into an argument for synchronically polysemic modal entries.

[2] I postpone the discussion of whether diachronic evidence is relevant for synchronic semantics until chapter 5.

Chapter Four

The Evidence for Polysemy Revisited (2): The Acquisition of Modality

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4.0 INTRODUCTORY REMARKS

In this chapter, I conclude the discussion of potential objections to a monosemy account for the modals by dealing with a rather different type of argument - an argument which hinges on developmental evidence. According to a widely held view in the psycholinguistic literature which has been around since the late seventies and early eighties, root modal meanings emerge earlier in language acquisition than epistemic ones. This claim has subsequently been employed in the linguistic literature as an argument for the position that modals are polysemous (Sweetser 1990: 50). This is one instance of the more general tendency to use inferences from development to support claims about the synchronic organisation of the adult lexicon. Specifically, as I have already mentioned in the Introduction, the acquisitional priority of one type of meaning of a lexical item (or a lexical class) over another is standardly employed as an argument for polysemy, particularly within Cognitive Linguistics.

What I want to do in the following pages is examine the argument concerning the acquisitional priority of root over epistemic modal meanings, and outline some reasons for being sceptical about both its descriptive accuracy and its explanatory relevance to the semantics of the adult lexicon. With respect to the former, I suggest that it is not as robust a conclusion as an initial survey of the literature would lead one to believe: there seems to be at least some counterevidence showing that young children can and do understand epistemically coloured modal items (Hirst and Weil 1982, Noveck, Ho and Sera 1996), or, similarly, mental terms (Moore, Bryant and Furrow 1989, Shatz, Wellman and Silber 1983). As for the latter, the connection

between developmental facts and polysemy-based analyses may be undermined if alternative explanations are found for whatever data genuinely show an earlier appearance of root interpretations. This can be achieved in various ways (and indeed it is plausible that complex factors will interact in the acquisition of a system as complicated as the English modal set); in the course of this chapter I will suggest that input data as well as performance limitations (mainly register inappropriateness) may influence the course of the child's acquisition of modality.

What I regard as the strongest explanation of the later development of epistemic interpretations, though, is my hypothesis that epistemic modality is metarepresentational.[1] If it is true that epistemic uses of modals mark the speaker's reflection on the content of her own mental states and thus hinges on abilities which are part and parcel of the child's developing theory of mind, then we have an independently motivated threshold for the emergence of epistemicity: meta-cognitive capacities are expected to reach an adequate level only well after the third birthday (and in fact close to four years of age - cf. Wellman 1990). The metarepresentation hypothesis about epistemic modality, apart from its explanatory potential in dealing with developmental facts, meshes well with a unitary semantic account of the modals, as developed in the previous chapters.

The chapter is structured as follows. In 4.1, I reconsider the order of acquisition of the various meanings conveyed by modal expressions on the basis of evidence from either naturalistic longitudinal studies or experimental data. Section 4.2 explores alternative explanations for whatever data about the acquisition of modality I take to be genuine and illuminating, focusing in particular on the metarepresentation hypothesis. I conclude in section 4.3 by sketching the implications for theories of semantic representation.[2]

[1] This hypothesis was first discussed in connection with acquisition in Papafragou (1997, 1998c).

[2] I should note here that most of the psycholinguistic literature I am going to review uses the term 'deontic' loosely to refer to simple root uses as well; I will be consistent in my use of the term 'root' for both cases, unless the arguments bear directly and solely on deontic modality.

4.1 PSYCHOLINGUISTIC EVIDENCE FOR THE ACQUISITION OF MODALITY

4.1.1 Naturalistic longitudinal studies

A number of studies focusing on syntactic aspects of modality (Brown 1973, Kuczaj and Maratsos 1983, Shatz, Billman and Yaniv 1986, among others, reviewed in Shatz and Wilcox 1991) all point to the following general conclusion: the use of English modals begins gradually, between 1;10 and 2;6,[3] often with a single negative modal form (such as *can't*) appearing in limited syntactic environments (mainly declaratives). As noted by Shatz and Wilcox (1991: 331), modal vocabulary growth proceeds fairly rapidly during this early period, while the range of syntactic constructions in which the modals appear changes somewhat more slowly.

Other studies set out to provide evidence about the early semantic properties of the modals. Wells (1979) is a case in point. As part of the Bristol Language Development Study, he time-sampled 60 children along with their mothers every three months from 1;3 to 3;6. Wells' general finding was that epistemic modality is acquired later than root modality. He notes that by 2;6 more than 50% of the children used *can* to convey both ability and permission; by the same time, children used *will* to communicate intention. Wells (1985) reports on a second sample of children followed from age 3;3 to 5;0. Between 2;9 and 3;0, children used *must, have (got) to* and *should* to communicate obligation or necessity, but, unlike *can* and *will*, these uses did not reach steady frequencies until later in development. In any case, by 3;3 all categories of root modality were in place. By contrast, children in his sample used *may* and *might* with an epistemic possibility meaning only by 3;3 years of age (here again, at least one occurrence from each child in half of the sample served as the acquisition metric). Use of modals to convey certainty was not achieved till much later, since by 5 only around 25% of the sample gave evidence of it. As for what Wells termed 'inferential' uses, e.g. the epistemic uses of *will* in examples such as *That will be the postman* (uttered on hearing footsteps), these seem to appear even later than expressions of certainty. Wells concludes that the acquisition of modality does not depend solely on syntactic criteria;

[3] The notation refers to years and months.

instead, semantic properties such as the (root) indication of modulation of action or social regulations facilitate the acquisition of modality.

Shepherd (1982) notes a similar progression of semantic development in the preschool years - although she found quite frequent epistemic uses of *could* alongside the expected group of root uses. After studying a single child, she notes that *will* extends from intention/volition to prediction between 2;5 and 3;0; while *will* takes up the space of more distant future or of events in the immediate future which lie beyond the child's control, *gonna* emerges as the indicator of events in the immediate future which are controlled by the child (cf. also Gee and Savasir 1985, although their conclusions are also based on a limited number of subjects). In another study, Pea, Mawby and MacCain (1982) found that, of 1,766 utterances containing a modal in the speech of a child between 1;11 and 3;4, only 7 express epistemic modality and 5 of these occur after 2;8. The discrepancy seems to extend to later ages: Kuczaj's (1977) results suggest that children between 2;6 and 3;6 produce in conversation more utterances with root modals than with epistemic modals when compared to children between the ages of 4;0 and 5;9 (cited in Hirst and Weil 1982). Corroborating findings have been reported by Perkins (1983), who has also conducted some independent research on a large corpus of spontaneous conversation among 6-12-year-old children (recorded as part of the Polytechnic of Wales Language Development Project). Perkins points out that it is only later in development that children come to fully acquire the adult modal system, especially as far as the epistemic uses of modals are concerned.

Stephany (1979/1986) is one of the few studies to include acquisitional data from languages other than English - among others, Modern Greek, Finnish and Turkish. The results she cites are in accordance with the previous findings which placed the acquisition of epistemic modality in the second half of the third year, and in fact well after the third birthday. Interestingly, Stephany broadens the acquisitional picture by reviewing developmental data concerning other expressions of modality. She observes that, in a number of languages (including Brazilian Portuguese, Italian, Modern Greek, Turkish, Swedish and Flemish), the first use of the imperfective past is not a temporal, but a modal one, serving to describe simulated activities and states and to assign roles during pretend play; a similar function is fulfilled in other languages by the conditional, the subjunctive, the optative as well as modal verbs. The age of

occurrence of these devices is around 3 years - a significant point to which I will return later in this chapter. Other markers of epistemic modality (the conditional in Finnish, the aorist inflection in Turkish, etc.) all seem to coincide around the third year of life.[4]

The univocality of previous research is challenged by the findings of Choi (1995). Choi studied the speech of three Korean children and traced the acquisition of five modal suffixes. The suffixes, which belong to an obligatory class of verbal inflections called sentence-ending (SE) suffixes, occur in informal interaction and are used to mark the status of the speaker's knowledge, i.e. evidential relations. More specifically, *-ta* indicates new/unassimilated information from the speaker's point of view, *-e* marks old/assimilated information, *-ci/cyana* indicates the certainty of a proposition (or shared information), *-tay* introduces non-shared knowledge/indirect evidence (e.g. hearsay or reported speech), and *-ta* (second type) marks information new to the hearer. According to Choi, this set of evidential suffixes is acquired between 1;8 and 3;0 years of age in roughly the order given above. The first two occur before the second birthday, *-ci/-cyana* appears productively with the onset of the second year, and the other two follow with three-month-intervals in between. Choi has also traced the acquisition of one epistemic modal auxiliary marking 'inference' and of four root modals encoding obligation, desire, ability and permission: all of them coincide developmentally between 2;6 and 3;6 years, and in any case appear much later than the modal SE suffixes.

Choi's research has been taken as prima facie evidence against the existence of a cognitive constraint on the early acquisition of epistemic modality (see, e.g., Shatz and Wilcox 1991: 332). Before we go on to some explanations, however, there are some points to be made about the interpretation of her findings. Choi herself has suggested some possible factors which may facilitate the acquisition of Korean modal SE suffixes: their perceptual salience (given their sentence-final position), their obligatoriness (and thus the richer input they provide to the acquisitional device), and their semantic consistency (they do not communicate root meanings, neither do they incorporate tense or aspectual meanings). More importantly, she is concerned with the acquisition of an evidential system rather than a modal system based on the notions of possibility and necessity. Two facts are particularly telling: firstly, not all Korean modal SE suffixes

[4] See also Stephany (1993) and the rest of the papers in Dittmar and Reich (1993).

were acquired by her sample: for example, children did not produce *-kwun* (:unassimilated inference based on newly perceived information). Secondly, not all the functions expressed in the adult grammar were present: *-ci* also expresses certainty of a proposition based on inference, but it did not appear with this meaning in children's speech. It is quite plausible that both evidentiality and epistemic modality turn on roughly the same *type* of cognitive abilities: in fact, I will argue later on that the latter - and possibly the former - are instantiations of the broader human metarepresentational capacity. However, epistemic modality makes stronger demands on the human metarepresentational device and it is therefore to be expected that genuine epistemic instances will emerge at more advanced stages of development.

It is important to stress at this point that, with the exception of Perkins, all of the above writers take a *semantic* root/epistemic distinction for granted; in other words, they use this distinction as a useful starting point for studying the acquisition of modal categories without worrying too much about finer distinctions of meaning. This often results in imprecision in the separation of individual root and epistemic meanings. As linguistic studies of modality have emphasised, it is often difficult to determine on a given occasion of utterance whether a modal verb should be assigned an epistemic or a root interpretation (cf. the discussion of 'indeterminacy' and 'merger' in Coates 1983). This is not intended as a general caveat but rather as a specific criticism of approaches such as Shepherd's, which assume without argument that there can be a principled distinction between volition and prediction, or immediacy and certainty. The same argument applies with equal force inside each of the two broad types of modality: for instance, there seems to be little independent evidence for Wells' (1985) distinction between the 'inferential' and 'certainty' sub-types of epistemic meaning (as they appear, e.g., in epistemic uses of *must*).

Another point worth mentioning with respect to naturalistic data is that they can only yield results about language production. However, the link between production and comprehension is not as straightforward as it might seem. In fact, production in children as a rule lags behind comprehension (E. Clark 1993);[5] in other words, children avoid using parts of a linguistic system of which they already have a grasp until they feel quite confident in the system they have constructed. In an early

[5] For different reasons, the production/comprehension gap is also manifest in adult speech.

study, Kuczaj and Maratsos (1975) demonstrated this very fact using elicited imitation with respect to the syntactic properties of the modals *can* and *will*. Inversely, very young children have been shown to occasionally use some members of a complicated grammatical system (e.g. an inflectional paradigm) correctly by simply memorising isolated items: production there does not guarantee successful acquisition of the whole system (as is further proven by the lack of overgeneralisations). It might be the case, therefore, that children do have a grasp of epistemic aspects of modality even before they start producing independent forms (within the limits, of course, that cognitive development and other factors will determine).

Despite the scepticism expressed in the previous paragraphs, the data seem to converge on the point that the onset of epistemic modality follows that of root modality, and typically appears around or after the third year. Two types of explanation have been advanced in the literature reviewed above. The first has to do with considerations of input: it is reasonable to assume that most modal expressions produced by parents to children will have to do with permission, obligation, ability and other related notions, rather than with inference and the evaluation of the necessity and possibility of a conclusion. Although mentioned only in passing by the above authors, I believe this is a line well worth pursuing and I will return to it in section 4.2. The second type of explanation has to do with factors in cognitive development, which are standardly couched in a Piagetian framework. Thus, Perkins (1983) attributes the early development of *can* and *will* in the preoperational stage to the child's egocentrism, which is also invoked to explain the absence of the more 'abstract' *must* and *may* (cf. also Choi 1995). After 7;0, in the so-called concrete operational stage, the negotiation of social roles and tasks begins; this period coincides with the proliferation of expressions of root modality. Finally, from about 11 years (the formal operational stage) comes the abstract representation of alternative hypotheses and of their deductive implications, hence the productive use of epistemic modality.

Setting aside theoretical objections to the Piagetian analysis, which lie outside the scope of this chapter,[6] the basic problem with Perkins' proposal is that it gets the facts wrong. As most of the naturalistic studies have demonstrated, the first instances

[6] For a starting point, see Piatelli-Palmarini (1980), Braine and Rumain (1983) and Wellman (1990). Cf. also Gopnik (1993: 7) for a snap argument against egocentrism.

of epistemic modality appear around the third year, much earlier than a Piagetian account would allow. Anticipating the discussion in later sections, it can be argued on the basis of experimental studies that children already entertain and process logical possibilities by 7 years, if not earlier, thus lowering Piaget's estimated thresholds for logical reasoning in children (Piaget 1928, 1987; cf. the similarly high estimates of Pieraut-LeBonniec 1980); moreover, evidence from the use of mental terms like *think, know, guess* to refer to one's own mental contents from around the age of 3 shows a type of cognitive ability which cannot be said to be tied to a simple, concrete mode of thinking.[7] In a nutshell, young children seem to be capable of handling the concept of mental representation - and related epistemic concepts - much earlier (and in much different ways) than the Piagetian framework credited them with (for detailed discussion, see Perner and Wilde Astington 1992). I conclude that, although the child's cognitive development is naturally the place to look for constraints on the acquisition of modality, existing linguistic/developmental analyses cannot adequately deal with the range of the child's emerging inferential abilities.[8]

4.1.2 Experimental studies

The oldest and best-known experiments on the acquisition of modality (at least in the linguistic literature) are those conducted by Hirst and Weil (1982). 54 children between 3;0 and 6;6 were given two different modal propositions of varying 'strength' (e.g. with a possibility vs. a necessity marker). In the epistemic cases, the propositions concerned the location of a peanut. In the root cases, they were commands by two teachers about

[7] In this paragraph, I have related the Piagetian stages of development to specific ages of acquisition, as the linguistic (and the majority of the psychological) literature has tended to do. Smith (1993) argues that the Piagetian framework is more appropriately seen as predicting broad differentiation over time, rather than being tied to specific age periods. Still, Smith admits that Piaget's own empirical accounts embody conclusions about the relations of children's age to developmental level, and notes: 'At best, this evident tension merits clarification; at worst, it marks inconsistency' (ibid. p.104).

[8] I have devoted space to the Piagetian analysis, since it is explicitly adopted by researchers who have provided longitudinal data; it would have been better if I had shown that a Cognitive Linguistics analysis would have trouble with these data. The problem is that I am not aware of any developmental studies cast in a purely Cognitive Linguistic framework: in any case, though, a Cognitive Linguistic account would not, I think, be fundamentally different in spirit from a Piagetian account, at least in terms of the dichotomy between concrete vs. abstract operations (cf., for instance, the Piagetian accounts of Overton 1990 and Ricco 1990 with their emphasis on the sensorimotor origins of logical necessity and possibility).

the room a puppet was to go to. The child was to indicate in the first case where the peanut was, and in the second where the puppet would go. The strength ordering assumed was *is* > *must* > *should* > *may*.[9] The general result was that children appreciate the relative strength of epistemic modal propositions about a year earlier than root modal propositions (5;0 vs. 6;0 years approximately); moreover, the greater the distance between the modals, the earlier the distinction is appreciated. Although these results seemingly provide arguments against previous research assigning to root meanings developmental priority over epistemic ones, the authors are careful not to draw any hasty conclusions: note that, while the epistemic tasks were pretty straightforward, the root ones depended on the child's evaluation of the authority of the persons issuing the command, as well as of the puppet's compliance with the rules, so that performance rather than competence factors might have caused the root/epistemic discrepancy. What the experiments do demonstrate, though, is that the order of acquisition of the relative modal strength is the same in both epistemic and root tests. This result suggests that the two senses of modals have not developed independently, thus offering an argument against polysemy-based (and, a fortiori, ambiguity-based) analyses.

Byrnes and Duff (1989) largely replicated Hirst and Weil's study with children aged between 3;0 and 5;0 years. 5-year olds performed overall better than the younger age groups, while younger children performed significantly better on epistemic rather than root tasks. For reasons similar to the performance factors mentioned above, however, these results are not conclusive: the authors used a highly desirable situation from the agent's point of view in the root tasks, and the children often responded using a 'rebellion strategy', that is, going against what they clearly understood to be an order. What is a more significant finding is that children performed better with words that were familiar to them (*has to, can't*) than more formal words (*might, might not*); although commonsensical, this fact has largely been overlooked in studies of the acquisition of modality.

Yet a third study inspired by Hirst and Weil's work is that of Noveck, Ho and Sera (1996). Noveck and his associates initially replicated the original hidden-object

[9] Hirst and Weil have ignored the possibility that an utterance containing *must*, on a logical/alethic construal of the modal, is actually stronger than an unmodalised declarative - probably thinking that such an interpretation would be unavailable to children of this age.

task and checked the detection of relative (epistemic) strength contrasts in *is* > *has to* > *might* among 32 5-year-olds; the results largely confirmed Hirst and Weil's findings.[10] In a more controversial move, Noveck et al. assumed that epistemic modals like *might* and *have to* are not simply 'relative force' indicators, i.e. they do not simply mark the speaker's commitment to the proposition which is embedded in the modal; these verbs also have a logical aspect, in that they mark possible or necessary inferences. They then went on to test the ability of children of various ages (5-, 7- and 9-year-olds) to appreciate the logical aspects of modals, and to compare their performance to that of adults. Subjects were presented with a hidden-object task, in which there were only two logically possible answers: subjects were in a position to infer those answers on the basis of information they were given by the experimenters. In one case, e.g., the deducible assumptions were 'There has to be a parrot in the box' and 'There might be a bear in the box'. The subjects then received two conflicting pieces of information from a puppet: namely, two modal utterances varying in strength, where the strong modal utterance was in fact misleading. In the above example, they would hear *There can't be a parrot in the box* and *There might be a bear in the box.* The experimenters predicted that, if children relied solely on the relative force of the modals, they should agree with the hint carrying greater speaker certainty; if they were able to detect logical aspects of the modals, they should go along with the correct (albeit weaker) utterance. It turned out that children of all age groups performed overall correctly, with successful performance rates rising in older children.[11] 5-year-olds were better with logically necessary, rather than simply possible, conclusions, but again their scores were far better than those predictable by chance.

With their second experiment, Noveck and his colleagues have thrown some light on the use of logical inference and the evaluation of logical necessity and possibility by young children. In particular, the fact that 7-year-olds show a significant

[10] In fact, preference for *is* over *has to* was not significantly different from predictions based on chance. Various lines of explanation may be offered for this: (i) *has to* might be judged more natural (hence, more reliable) in a context where the hidden object has been out of view from the start; *is* would inappropriately suggest that the person providing the hint (actually, a puppet) possesses direct evidence for the location of the object; (ii) there are many contexts in which *has to* is stronger than (entails) *is* - see previous footnote for a similar point on the *must/is* contrast.

[11] In one variant of the task, equally 'forceful' modals were used, although only one of them was a valid hint: the prediction was that, if children rely on the relative force of modals, chance responding would occur. Even with 5-year-olds, though, the correct hint was chosen at a rate significantly greater than chance.

ability to detect logical possibility lowers previous estimates (going up to 9 years of age), although admittedly the experimental setting might have facilitated things considerably. I will return to these results later on. For the moment, the issue is whether the second experiment has demonstrated anything about the comprehension of epistemic modality; I think it has not. There was, I submit, no difference in the comprehension of the modal utterances between the first and second experiment: both experiments involved epistemic interpretations. What did change was the range of evidence available to the subjects in either case. While in the initial series of experiments children had to rely exclusively on the puppet's hints to discover the location of a hidden object, in the second they also possessed independent information, which was apparently more reliable than any subsequent hints: since the box containing the hidden object was closed from the start, it is reasonable to assume that the puppet supplying the modal hint might not have first-hand knowledge about the object's location, and in any case, it is not as reliable as the information objectively presented to the children before the trial began. The subjects were thus encouraged to draw on what they knew themselves, rather than give credence to the puppet's apparent guesses. Rather than detecting a distinct, purely logical aspect in epistemic modals, the second experiment thus gives evidence of how epistemically modalised utterances can be used and evaluated as one information-source among others in a general deductive reasoning process employed by young children.[12]

Let me finally turn to Coates (1988), who tested older children's comprehension of modals with respect to the epistemic/root distinction. She asked adult, 12-year-old and 8-year-old subjects to sort cards, each containing a modalised version of the sentence *I visit my grandmother tomorrow*, into piles on the basis of similarity of meaning. Cluster analysis revealed four distinct groups in the adult system:

(a) epistemic possibility (*may, might, perhaps, possible that, probably*);

(b) possibility/ability/permission (*can, could, nothing prevents, allowed, able, possible for*);

(c) intention/prediction/futurity (*will, shall, going to, intend*);

(d) obligation/necessity (*must, should, ought, have got to, obliged*).

[12] See section 2.4.3 for reasons why Noveck et al. can't be right in conflating logical and epistemic modality. On the importance of metalogical reasoning for the full appreciation of epistemic modals, see 4.2.3.

12-year-olds also distinguished four categories, although there were some minor differences between the two subject groups as to the classification of specific items. 8-year-olds, on the other hand, did not include a category for epistemic modality and were in general less consistent in their options as a group. Coates concludes that the mastery of the modal system is achieved at a relatively later age. There are several potential problems with this experiment, however. First, a number of her examples are indeterminate between different interpretations; for instance, *I can visit my grandmother tomorrow* can indicate both ability and permission. Second, even the adult classification imperfectly matches the range of interpretations the modals may exhibit; *may*, for example, is capable of communicating permission as well as epistemic possibility, while *probably* can be said to convey prediction as much as epistemic possibility. Third, as Coates herself acknowledges, the linguistic construction she has used disallows certain interpretations, which are otherwise present in the language: logical necessity expressed by *must* is one example. Given that similarity is a fairly vague criterion itself, and that modals fall into various overlapping categories, it is not surprising that subjects seem to have classified modals depending on the verbs' preferred interpretations; it is, after all, pragmatic and not semantic intuitions that speakers typically tap when reflecting on the meaning of linguistic constructions (see the experimental evidence in Gibbs and Moise 1997).

Overall, then, experimental evidence has been less illuminating than naturalistic studies as to the acquisition of root and epistemic aspects of modals. However, we still lack an explanation of these findings, and this is what I will start to develop in the next section.

4.2 Alternative Explanations

4.2.1 The theory of mind hypothesis

According to the hypothesis I have proposed in previous chapters, successful use of epistemic modals requires the speaker to perform deductive operations on abstract propositions (i.e. on the content of her beliefs *as such*) and to arrive at a warranted conclusion. As I have already mentioned in section 2.4.1, the metacognitive abilities

which epistemic uses draw on have been examined in recent psychological work under the label 'theory of mind'. In what follows, I would like to construct an account of the acquisition of modal verbs by elaborating the link between epistemic modality and the child's developing theory of mind.

Let me start with a broad picture of the child's early understanding of mind (or mentalising ability, as psychologists commonly call it).[13] Some psychological knowledge seems to be in place as early as the second year of life. 2-year-olds have a non-representational grasp of desire and perception, whereby desires are conceived roughly as drives towards objects and perceptions as awareness of/visual contact with objects. From this initial understanding of desire and perception as simple causal links between the mind and the world, 3-year-olds go on to develop a non-representational conception of belief along much the same lines. Belief contents are taken to directly reflect the world (the 'copy theory', as Wellman 1990 calls it). As a result, children of this age notoriously fail to detect misrepresentation (cf. the classic false-belief task) and are incapable of acknowledging that beliefs may have different sources or come with varying degrees of conviction. By 4;0 or 5;0 years, children seem to have developed a 'representational model of mind' (Forguson and Gopnik 1988): almost all psychological functioning (desires, perceptions, beliefs, pretences, and images) is mediated by representations of reality. Mental representations are increasingly employed in explanatory accounts of human thought and action.

Against this developmental background, the emergence of epistemic modal concepts appears tightly linked to the shift in the child's epistemological concepts which takes place around the third year. Recall that other properties which surface as a result of this shift are the ability to take into account the reliability of one's beliefs (i.e. the relative strength with which they are entertained), the ability to conceive of one's mental contents as representations distinct from reality, which may change over time or differ more or less dramatically from those of other people, and so on.

[13] This paragraph draws heavily on Gopnik and Wellman (1994). This exposition does not signify any particular theoretical preference for the 'theory theory' version - Gopnik and Wellman (1994), Gopnik (1996), Gopnik and Meltzoff (1997), Wellman (1990) - over the 'modularist' position on theory of mind - Leslie (1991, 1994), Leslie and Roth (1993), Segal (1996): nothing I want to say about modality here seems to hinge crucially on the details of existing accounts. It is an interesting issue whether modality could be used as a case study to bring out empirical differences between these approaches.

Significantly, one group of data which has been instrumental in the advancement of the theory of mind hypothesis consists of mental terms (e.g. *know, think, mean, remember, forget, guess, hope*, etc.): the acquisition of these terms, although distinct from, is obviously related to that of epistemic modal verbs, and might be useful in establishing a parallel between the two classes. More specifically, mental terms have been shown to arise in the spontaneous speech of children between 2;4 and 3;0 years of age (Shatz, Wellman and Silber 1983); however, they are initially used rather as conversational devices ('hedges'), without a full command of their representational meaning, in phrases like *you know, I think.* Genuine mental state uses begin after 2;8, often in situations where the child contrasts reality to a representation of reality (a belief, a dream, etc.). Other studies report that children are able to make distinctions of relative strength between verbs like *know/be sure* and *think/guess* only by their fourth year (Moore, Bryant and Furrow 1989, Moore and Davidge 1989).

How can the empirical data on mental terms be brought to bear on the acquisition of epistemic modality? A first interesting correlation comes from the temporal pattern of acquisition: according to the data presented in section 4.1, occurrences of epistemic modality are rare before the third year, and mostly appear beyond 3;6 years. There is some indication that children use epistemic expressions such as *maybe* before modal auxiliaries (Stephany 1979/1986: 395); this, however, can be viewed as an isolated rote-learned member of a system which the child cannot as yet fully comprehend - on a par with conversational uses of mental terms (cf. the memorisation of isolated parts of a complicated system in the first stages of acquisition, discussed in section 4.1.1).[14]

We have seen that after 4 years epistemic uses become more frequent and appear in a larger number of modal items; it is also at this period, and especially around 5;0, that children begin to understand strength distinctions among modal verbs, and between epistemic modal verbs and unmodalised declaratives (cf. the Hirst and Weil-type studies). These findings correlate pretty well with the mental verb data, and

[14] This deals with a potentially problematic point for my 'theory of mind' hypothesis: if theory of mind abilities are not present before 4 years (and are still developing by the age of 6;0), how can the earliest uses of epistemic modal expressions be accounted for? My answer is this: 3-year-olds have some understanding of the mental world, which allows first (incompletely understood) epistemic uses. Even after 4;0, however, metacognitive capacities develop over a long period of time, over which various aspects of epistemicity will emerge and stabilise. For instance, even within the space of epistemic modality, expressions of possibility precede those of necessity (cf. sections 4.2.2 and 4.2.3).

together fit the threshold of 4;0 to 5;0 for the emergence of a representational model of mind. Moreover, it makes good sense to assume that the ability to acknowledge the source of one's beliefs, to recognise one's past beliefs, and to realise that beliefs vary in strength and accuracy develop in parallel with one's ability to deductively process one's existing beliefs and to evaluate a proposition with respect to the cognitive support it receives from one's knowledge.

It is generally true that children first introduce a distinction between reality and non-reality (or representation of reality), and then proceed to make finer distinctions inside the epistemic modal space. Given at least the linguistic evidence, one would expect various aspects of metarepresentational capacities to evolve across time and surface in different grammatical structures; if we go beyond the English modal verbs to other epistemic expressions, we would expect the development of the child's theory of mind to place at least a lower bound on the emergence of hypothetical reference, conditionals, and other related constructions. It should be obvious that, far from attributing to young preschoolers the ability to perform *conscious* meta-cognitive reflection, my claim about their metarepresentational abilities concerns their growing ability to mentalise, i.e. to understand mental representation. In all of these cases, one must be careful to avoid circularity of argument, i.e. not to invoke the same type of data as both evidence for theory of mind and predictions following from a representational model of the mental.

Still, one might ask, if the present status of the theory of mind hypothesis entails a threshold for the appearance of metarepresentational properties, how does it account for apparent counterexamples? I have already mentioned Choi's research on Korean SE suffixes, which has led some to question the existence of cognitive constraints on the acquisition of epistemic modality and to resort to weaker hypotheses (Shatz and Wilcox 1991). Choi placed the acquisition of these evidential suffixes between 1;8 and 3;0 years, much earlier than a proper theory of mind can be said to emerge. Nevertheless, in what follows I want to speculate on possible ways of reconciling her findings with what we know so far about infant cognition.

First, as stressed by Gopnik and Wellman (1994), even 2-year-olds have some notions, however vague, of internal psychological states; this is particularly evidenced by early 'conversational' interaction, facial imitation and joint-attention behaviour. Still,

we wouldn't expect anything but the simplest causal relation to be recognised between the mind (particularly desires and perceptions) and the world. The Korean suffixes acquired before the second birthday are *-ta* and *-e*, which mark new and old information respectively: a first guess then might be that, given the rich input they receive, young Korean children start marking off with *-ta* information that has recently been acquired through direct perception; this is borne out in Choi's data. *-e* is reserved for a variety of functions such as past tense, questions, etc. The appearance of *-ci/-cyana* in the beginning of the second year signals certainty of information, but again it is a certainty closely associated with direct and compelling perceptual evidence. Other uses of this morpheme are reserved for marking repetitions of a previous utterance or, in Choi's terms, 'shared knowledge' between interlocutors; however, such 'shared knowledge' uses do not exactly deserve their name, since they do not actually entail any representation of what the interlocutor *knows*: if true, this would indeed refute the present formulation of the theory of mind hypothesis. Repetition, though, need differ only minimally from marking something as old information; consequently, *-ci/-cyana* need do little more than accompany a retrieval from memory. So far nothing in the Korean data necessitates a recognition on the part of the child of a mental state *as such*. This is not to say that the child does not reason about mental contents (e.g. propositions she has recently formed, or the sources thereof) but, crucially, she does not perceive these mental contents as *mental* contents.[15]

What about the suffixes which occur in the third year? I think there is a genuine qualitative change here. *-tay*, a reported speech marker, serves to mark the beginnings of a representational conception of the mind, since it presupposes the ability to attribute to someone else thoughts, utterances or emotional states (corresponding uses of the suffix are documented by Choi). *-ta* (with a high pitch) was used by slightly older children for information which the child had from first-hand experience. Choi maintains that this suffix also conveys information new to the hearer: however, there is no evidence from her examples that it need be so (note that she says the same thing for indirect speech markers). What the utterances with *-ta* (Type 2) share is that they describe things a child might consider new, important or, in general, emotionally

[15] Cf. Wellman (1993) for a similar argument about understanding pretence vs. engaging in pretence (pretend play also appears in the second year of age).

exciting, things which she wishes to 'brag about' (in Choi's words, who admits that there is an 'affective component' in what is conveyed by this suffix). This is consonant with an emerging theory of propositional attitudes, although it by no means implies that the child is in a position to detect partial knowledge in the hearer (an ability that normally emerges much later in development). Note, by the way, that if *-ci/-cyana* truly marked shared knowledge already from the second year, there should be no reason for the lag between that suffix and *-ta*, which would involve a comparable insight into the hearer's mental state.

Undoubtedly, the acquisition of modals and evidentials is not as straightforward as my discussion of Choi's findings suggests. One probably has to take into account formal properties of individual languages as well. For instance, Stephany (1979/1986) points out that modal categories like the subjunctive in Modern Greek and the optative in Turkish appear earlier than the modal auxiliaries in English; the reason she gives is that morphological structural devices are acquired earlier than syntactic ones, since they are 'part of tightly knit lexical forms' (ibid. p.198). Similar considerations apply in the case of Korean, where SE suffixes belong to well-formedness conditions for sentences, so there is pressure to start using them even if the child has not mastered the meanings of the morphemes. Moreover, I do not want to imply that the Korean modal suffixational system is definitely *not* metarepresentational: a fuller investigation of the adult system (of which Choi gives us only a partial glimpse) might prove that it really rests on higher-order cognitive abilities - in fact, I have hinted in chapter 3 that most evidential systems draw on metarepresentational abilities to a large extent.[16] All I claim now is that young children may go about using this extremely complex system on the basis of a limited cognitive machinery, and no account has convincingly demonstrated that they need anything more to do so than what the theory of mind hypothesis already presupposes.

[16] Aksu-Koç (1986) reports that evidential markers in Turkish appear around the third year, with a marked improvement around the age of four: this is precisely what one would expect if evidentials introduce metarepresentations.

4.2.2 Auxiliary hypotheses and a sketch

In order to predict the specific order of appearance of root vs. epistemic modal interpretations in acquisition, we have to make use of more specific supplementary hypotheses about language acquisition, which will elaborate on the broad cognitive constraints placed by theory of mind development. A commonsensical, yet controversial, suggestion concerns the role of input in the priming of root over epistemic interpretations in the preschool years. Shatz, Grimm, Wilcox and Niemeier-Wind (1990) gathered samples of maternal speech to infants of around 3 years and found that fewer than 10% of the modals used had epistemic interpretations. Similarly, Wells (1979) remarks that *will* and *can* were used by all mothers in his sample, and they were also the most frequently occurring modals; we have seen that these two verbs were the first to be acquired by the children in the sample. Other studies focusing on semantic-pragmatic aspects of modal acquisition also detect a correlation between the input children receive and the type of modals they produce (Shatz, Grimm, Wilcox and Niemeier-Wind 1989, Shatz and Wilcox 1991).

The motherese hypothesis has been largely discredited as an explanation of the syntactic aspects of language acquisition (Gleitman, Newport and Gleitman 1984); things might be different, though, in the acquisition of word meanings, where lexical entries are mapped onto conceptual addresses. Given a certain stage in cognitive development, input could partially determine the output of the child's production by triggering assignments of word meaning. In the case of modality, it is reasonable to assume that (at least some) root interpretations lie within the cognitive grasp of young preschoolers, since they are taken to involve ability (*can*), desire (cf. volition in *will*), and later on permission and obligation (initially understood as normative descriptive statements about what is the case in the actual world). The increased frequency of such terms in the children's input is bound to facilitate their acquisition.

A related argument comes from the frequently noted observation that epistemic modals, especially in English, are rather formal expressions, and would be unlikely to arise in children's spontaneous conversation (but cf. other epistemic expressions like *have to*, or mental terms). An indication that register, alongside other pragmatic limitations, may influence the use and mastery of individual modal forms, even in the

absence of competence-related obstacles, is the fact that *ought to* seems to lag behind the other modals (it is used to state obligation by only 3% of Wells' 1979 sample; Coates' 1988 subjects also had difficulty with the verb). Apart from the children's unfamiliarity with epistemic modals, it is also true that children normally find themselves more often in situations where the topic of conversation has to do with permission, ability, intention or obligation, so that even after the age of 3;0 they do not produce as many utterances with epistemic modals as with root ones.

I will finally mention another independently motivated principle which may help to account for the acquisition of the root/epistemic distinction: children, in constructing their lexicon, tend as a rule to avoid synonymy; that is, when forming hypotheses about lexical entries, they try to avoid assigning the same meaning to two different linguistic forms (the 'principle of contrast' - E. Clark 1990). This principle gives rise to the following prediction: children who have already successfully acquired mental terms will hesitate to assign epistemic interpretations to modal verbs (which they already use for a variety of root meanings) to convey the relative strength of a proposition.[17] Within each member of the root/epistemic distinction, the same principle may be used to explain why more striking oppositions in strength among modals (e.g. *must* vs. *may*) are acquired first, whereas the *is* vs. epistemic *must* contrast is acquired later (cf. the Hirst and Weil-type experiments).

There is obviously a lot more to be said on the interplay between competence and performance factors in the acquisition of modality, and a fuller picture of the predictions of the theory of mind approach remains to be given. Before moving on to an outline of this picture, however, I want to consider a possible objection to the analysis as it stands. It might be claimed that I have only presented part of the acquisitional story. More specifically, in deontic modality the individual has to compute whether something is necessary or possible on the basis of social or moral rules and regulations. Such rules are distinct from representations of reality, strictly speaking, in that they constitute descriptions of an ideal/exemplary rather than the actual world. Furthermore, other types of deontic interpretation crucially rely on the desirability of a certain state of affairs, and thereby involve attitudes such as desires, preferences,

[17] 'Synonymy' is obviously used loosely here; mental terms and epistemic modals are not strictly speaking synonymous.

intentions, goals and aspirations. To concentrate on a salient example: suppose, following Premack and Premack (1994), that the basic notion of intention is not in place before 3;0 (as the theory of mind hypothesis would predict) and develops even up to 6;0 years: as for the acquisition of moral beliefs, it takes place even later. It follows that - the present literature notwithstanding - no genuine (adult-type) deontic modals can appear before these concepts are fully in place.

My reply is this: I by no means suppose that the development of the theory of mind affects only one side of the root/epistemic distinction. Moreover, it is clear that other factors enter into the acquisition of the full array of modal interpretations: for instance, in order to be able to use root modals to *impose* an obligation or to *grant* permission (and not merely note them), the individual must possess a range of assumptions concerning social relations, authority, etc. Therefore, I agree that some root interpretations will emerge later than others. What is crucial, though, for at least some root interpretations, is that the child may go about using them without having a fully developed representational picture of mind, while in order for epistemic interpretations to arise, this picture should by definition be emerging in the child's psychology. The point is that the construction of alternative domains of assumptions (ideal, stereotypical, morally recommended, etc.) does not depend on metarepresentational capacities, since the individual does not have to focus on the representing act iteself, or the content of a mental representation *as such.*[18] Obviously, to the extent that some varieties of desire-based attitudes such as intention also rely on belief, the development of more specialised varieties of deontic concepts is tightly linked to metacognition. Still, we can maintain the emergence of metarepresentational capacities as a general threshold for epistemic concepts and propose more detailed paths of development for more specific aspects of modal concepts (and their lexical expressions).

To illustrate, here is a sketch of how the development of modal expressions might go. The first uses of English modals appear before the third year: consonantly with what a basic desire-intention psychology would predict, 'ability' *can* and '(quasi-) intention' *will* are the first modals to be employed to a significant degree by infants.

[18] One may draw a parallel between these alternative domains of assumptions and the alternative temporal models of the actual world (past, present, etc.); cf. Perner's (1991) 'multiple models' for an elaboration of this idea.

With the emergence of a preliminary copy theory of belief coincide other uses of root modals: *must* and *may* appear with increasing frequency at this stage to convey obligation and permission respectively. However, genuine deontic meanings cannot be communicated yet, since the child still conceives of the mind as a container, that is, as a simple storage place for immediate and accurate representations of reality which are, so to speak, forced upon it by external stimuli: the inability to form representations which are not identical to reality and to entertain them as alternatives to it disallows the formation of deontic interpretations, for the reasons given in the previous paragraph. When a child utters a statement containing (root) *must* at this period, she rather intends it as a description of a normative regularity (and similarly for *may*). This seems to be corroborated by the empirical data (cf. Perkins 1983, who reports a predominance of first-person-singular occurrences of modals at this age), and squares well with the sort of input the child receives from her caretakers.

Around the third year the use of epistemic modals and mental terms also begins, initially without full understanding of their meaning - these items are simply used as relative strength markers with no explicit representation of their inferential component. Further development of the child's theory of mind leads to the conception of the mind as a processor, that is, a device which actively constructs and handles representations of reality; conceptual developments of this type open the way to the comprehension of mismatches between one's mental constructs and the world (and, thus, to the identification of false belief, degrees and sources of belief, and so on). The child is by now capable of grasping the meaning of mental terms and of properly using epistemic modals like *may* and *might* (Wells 1985). Between 4;0 and 6;0 the ability to calculate possibility on the basis of available data is solidified, together with an understanding of the differences in strength among modals depending on the type of inferential relation they encode (possibility or necessity): still, a full grasp of the notion of necessity, which involves checking through all possible alternatives, escapes many young children. With regard to root interpretations, the active deployment of alternatives to the actual world, and especially ideal/morally recommended alternatives, clears the way towards a proper use of deontic interpretations: apart from register difficulties, the markedly later emergence of deontic *ought to* in acquisition can be attributed to conceptual difficulties

associated with the domain of ideals or morality (cf. also Harris and Núñez 1997: 220).

After the sixth year the child begins to acquire a fuller understanding of modal notions, particularly of necessity, which gradually proceeds to the full-blown development of the adult modal system (see next sub-section). On the semantic side, it is very plausible that, once the theory of mind is fully deployed, the child will reorganise former superficially used root concepts, and will trace the similarities between root and epistemic meanings based on common possibility and necessity underpinnings. By that time, the child will be able to construct a single lexical entry for most modals and treat root or epistemic interpretations as pragmatic developments of an underlying unitary modal semantics.[19]

4.3.3 From metacognition to metalogic: The emergence of alethic modality

Some further evidence for the account I have been advancing so far comes from the sort of modal notion which logicians have termed alethic (or logical) modality. As I mentioned in chapter 2, this type of modality concerns logical necessity and possibility defined independently of a thinking agent's mental contents, but in an absolute sense as relations between an (abstract) proposition and a set of propositions.

Even though they correspond to distinct types of modality, the ability to entertain alethic concepts is essentially of the same type as the ability to employ epistemic notions: i.e. it rests on the capacity to envisage propositional representations as entities distinct from reality which enter into specific logical relations. Moreover, it marks a more sophisticated step in this direction, in that the subject moves from entertaining thought contents and performing deductive operations on them to realising that certain logical relations such as compatibility and entailment obtain between propositional contents in the abstract, *mind-independently*. In other words, alethic concepts presuppose the ability to reason about what is simply possible or necessary, thereby considering alternatives that are not included in the individual's knowledge but are predicted by general logical laws.

[19] A fuller exposition should take into account other aspects of the acquisition of the modal system, such as the interaction with negation or the past tense.

Epistemic and logical interpretations of modal expressions are often empirically hard to distinguish. Still, there seems to be some evidence for the later emergence of pure, alethic concepts in children. Although some sensitivity to logical necessity has been attributed to infants as young as 3;0 (Fabricius, Sophian and Wellman 1987), it is generally acknowledged that children younger than 4;0 rarely take into account more than one possibility in hidden-object tasks (Sophian and Somerville 1988).[20] It is also after 4;0 that an ability to declare a solution to a task undecidable between alternatives arises: it seems that, with training, children can recognise undecidability as early as 5;0 (Byrnes and Beilin 1991). As other studies have shown, children at 5;0 or 6;0 have at least a receptive understanding of the necessary truth or falsity of propositions (Russell 1982). More tellingly, though, the ability to reason about hypothetical possibilities, to generate possibilities that have not been specified in advance and to systematically collect and combine the information needed to move from a large set of possibilities to a single necessary conclusion is attributed only to much older children (7;0 to 9;0 years old - Sophian and Somerville 1988, Byrnes and Overton 1986; cf. Osherson and Markman 1975 on the ability to detect contradictions and tautologies). This ordering is mirrored in the acquisition of modal terms: Perkins (1983) reports that logical (what he calls 'objectified') interpretations of expressions like *possibly, it is possible that, there is a possibility that* are acquired between 6;0 and 12;0 years.

Metalogical activities are typically conscious, or at least accessible to consciousness (Moshman 1990). Although I have presented them separately here, I intend them to be construed as a domain closely related to metacognitive/metapsychological processes and developing in parallel with them. Although the situation is extremely complicated, one can complete the picture of the acquisition of modality offered in the previous section by venturing the following speculations: as part of the development of the child's second-order reflective capacities, and after the basic deductive abilities have been mastered, the general metacognitive process of reflecting on one's mental contents could be extended to the more advanced metalogical task of reflecting on one's logical (deductive) processing steps. The latter capacity proceeds towards freeing propositional representations from

[20] Memory limitations may also play a role in this (although for a different position, see Byrnes and Beilin 1991).

the mental repertoire of a thinking agent and viewing them as abstract entities (thereby giving rise to alethic concepts). The development of metalogic, alongside that of metacognition, is accompanied by a deeper understanding of epistemic modal concepts, to the extent that it permits a full grasp of their inferential component. An initial manifestation of the comprehension of logical modality comes from recognising the solution to a problem as undecidable, when there is not conclusive evidence available - an ability which surfaces only around 6;0 years (Moshman 1990). With the stabilisation of the ability to check through all possible alternatives and its generalisation across environments there emerges the concept of logical necessity, which is firmly established around 11;0 to 12;0 years. The child is then able to completely separate the logical and the empirical domain and to detect the validity of an argument based solely on its form, and not on the content of the premises. Indeed, a number of researchers have recognised that, by this time, the child's modal system closely parallels that of adults.[21]

4.3 CONCLUDING REMARKS

The paradigm of the English modals has been quite instructive as to the explanatory scope of polysemy analyses. Root and epistemic modal meanings, on these analyses, are taken to be mutually exclusive and separate semantic categories; root meanings enjoy conceptual and acquisitional priority and are related metaphorically to epistemic meanings. A polysemy-based account leaves a number of questions unanswered. First, is a metaphorical projection an appropriate means of capturing the relation between root and epistemic interpretations of modals? If the metaphorical analysis put forward by Sweetser (1990) entails a specific developmental ordering (as she believes, and as one would expect), one should be able to give some independent evidence that the onset of the acquisition of metaphor coincides with that of epistemic modality; to say

[21] Depending on one's favourite version of the modularisation of cognition, the development of metacognition and metalogic can be seen as the progressive construction of theories, or an ordering in the maturation/triggering of different internal modules (cf. footnote 13 above).

The discussion so far serves to clarify a possible confusion: one might argue that, since validity is standardly defined through alethic necessity, alethic modality is required for the successful use of root and/or epistemic modals. However, it is one thing to make a correct deduction, and quite another to understand its validity (cf. footnote 15 for a similar observation): only the first is involved in most early modal uses, and it requires logical, rather than metalogical, competence.

simply that the manifested root/epistemic ordering vindicates a metaphorical analysis is to beg the question.[22]

Second, how compelling is the claim that it is the whole root meaning which is projected onto the epistemic domain? One could well argue that the polysemy account suffers from an unnecessary redundancy, as it assumes that metaphorical projection takes place in both the meaning of modal verbs and the type of propositions they range over; a more parsimonious account would suggest that the meaning of the modals remains constant but the child realises that various interpretations can arise depending on the kind of proposition which forms the complement of the modal.

Third, why is it that certain modals lag behind others in acquisition? I have in mind *ought to* compared with the other root modals and *must* compared to other epistemic modal verbs. On the polysemy account, there are no obvious conceptual reasons, once other members of the same domain (root or epistemic) have already been acquired. It seems that the metaphor story can at most be only part of an account of the development of modal concepts in the child's cognition and communication.

I believe that acquisitional data lend no support to a polysemy analysis. In this chapter, after having reconsidered the psycholinguistic evidence for the development of modality, I have advanced an explanation for the acquisitional priority of root over epistemic interpretations of English modals which does not hinge on the definitional/conceptual priority of root interpretations (*contra* polysemy-based approaches). My analysis throughout has assumed that the developmental data involve the acquisition of pragmatic, rather than semantic, categories. More specifically, I have argued that the later emergence of epistemic uses can be predicted from independent assumptions about the child's emerging theory of mind. After the full array of the adult metarepresentational capacities is activated in the child, she will be able to detect a common possibility- or necessity-based core across root and epistemic interpretations of different modal verbs, and thus rearrange their lexical entries around a unitary semantics. So the elaboration of a link between epistemic modality and higher-order

[22] Of course, given that metaphor also relies on metarepresentational abilities, it is expected that there will, in fact, be a temporal correlation between the acquisition of epistemic modality and the appearance of metaphor in child language. Still, the point of my argument is to detect a missing conceptual step in Sweetser's argument, rather than to claim that the correlation she argues for is developmentally unwarranted (for a relevance-theoretic analysis of metaphor as involving interpretive use, see Sperber and Wilson 1986/1995).

metarepresentational cognitive abilities yields two desirable results. On the one hand, it provides a motivated and theoretically exciting connection between early linguistic and conceptual capacities. On the other, it avoids the postulation of multiple senses for the modals in the adult lexicon: by maintaining a parsimonious, abstract semantics for modals, epistemic interpretations can be shown to arise whenever the speaker is taken to be deductively processing the contents of her beliefs *qua* mental representations in order to arrive at the proposition which forms the complement of the modal verb.

One might object that a theory of mind approach does not guarantee a unitary semantics for modals, and that some version of a polysemy account could be made to turn on the cognitive developments I have outlined; the fact remains that no such candidate analysis exists at present. Furthermore, a new-look polysemy account would have to abandon the central contention of its present counterparts that epistemic meanings somehow rely on root ones for their construction. In any case, no version of a polysemy account could deal satisfactorily with alethic modality. If the metaphor-based analysis were stretched to include alethic concepts, it would have to treat them as yet another semantically specified category, probably recognising some similarities between these and epistemic modal concepts. Such an analysis would have no means of motivating their late appearance in acquisition, since it is unclear how a novel metaphorical mapping could be used as part of the explanation. As for other versions of polysemy accounts, they would have to circumvent at least the following obvious fact: whether modal adverbs and adjectives of the sort in (1) and (2) communicate epistemic or alethic meanings on a given occasion depends on the type of the proposition in the complement as well as on general contextual considerations, and cannnot be predicted solely on the basis of semantic/syntactic facts:

(1) It's possible that John will inherit the house.

(2) There is a possibility that John will inherit the house.

One thing to notice about the correlation between the emergence of epistemic concepts and theory of mind is that it lends itself to experimental testing. An obvious place to look is autistic subjects' performance with epistemic modality, since it has been persuasively argued that autism involves a deficit in theory of mind abilities (Baron-

Cohen, Leslie and Frith 1985). Some work has been done in this connection, but the results are not always straightforward (de Roeck and Nuyts 1994); for more details, I refer the reader to the Appendix to this chapter. More on the linguistic side, it would be interesting to revisit the widely accepted association between developmental arguments for polysemy and historical-linguistic arguments in a version of the 'ontogeny recapitulates phylogeny' tenet. But this leads us straight to the topic of the next chapter.

Appendix 4A

Linguistic Data from Autism

Autism is a severe childhood psychiatric condition which is characterised by a number of social and communicative impairments. Autistic children lack the usual cognitive flexibility, imagination and pretence, and their behaviour is marked by a restricted range of interests and activities.[1] Recently, a number of authors have suggested that (at least certain aspects of) autism can be explained as resulting from lack of the theory of mind, or mentalising capacity (Baron-Cohen, Leslie and Frith 1985, Leslie 1991, Leslie and Roth 1993, Leslie and Thaiss 1992, Frith 1989, Baron-Cohen 1995). On this hypothesis, autism is a form of mindblindness with a number of implications for cognitive development. Children who suffer from autism are unable to understand (and attribute) false beliefs; they cannot appreciate the mind/brain as an organ with mental functions; they are unable to realise that seeing leads to knowing; they experience difficulty with the mental-physical and appearance-reality distinctions. As I mentioned earlier in this chapter, onset of the acquisition of these aspects of the human theory of mind normally falls around the age of three or four; autistic children differ from both normal children and children suffering from various other disorders (e.g. Down's syndrome) in that their mentalising abilities are selectively impaired.

The mindblindness hypothesis about autism offers a solid testbed for the link which I have sought to establish between epistemicity and mindreading. If, as I have suggested, the development of the metarepresentational machinery responsible for mentalising is a prerequisite to the full-blown and correct production and comprehension of epistemic modal markers, then there should be a severe difficulty

[1] For fuller descriptions of specific disorders in autism, see Aarons and Gittens (1991), Dawson (1989), Happé (1994), and the essays in Wing (1976) and Baron-Cohen, Tager-Flusberg and Cohen (1992).

with such terms in the language of autism. In the following pages, I want to discuss the findings of a study by de Roeck and Nuyts (1994) which appears to disconfirm this dissociation between autistic language and epistemicity.

de Roeck and Nuyts set out to investigate the use of three markers of epistemic modality in Dutch by four high-functioning autistic adults. The subjects covered an age range between 19 and 29 years; their total and verbal IQ ratings were 113t (116v), 96.5t (121v), 88t (77v) and 68t (77v) (where t = total and v = verbal IQ). Three modal items were studied on the basis of a corpus of spontaneous speech data: *waarschijnlijk* 'probable/probably' (the item has both adjectival and adverbial uses); *denken* 'think' and *kunnen* 'can/may'.

The results of the study can be summarised as follows. The adjectival use of *waarschijklijk* is completely absent from the data, a fact which is not particularly surprising given the low rates of occurrence of this use even in normal speech. As for the adverbial use, it occurs rather normally in the speech of two of the four subjects. *Denken* is used by all four subjects, and there is evidence of both its complement-taking and its parenthetical uses. Finally, *kunnen* is used as an epistemic modal with higher frequency than in normal speech (where it is more often used to express simple root/deontic modality). The authors conclude that all four subjects demonstrably use epistemic expressions in ways much similar to normal subjects and therefore appear to engage in metarepresentation quite unproblematically. Consequently, the performance of these high-functioning autistic adults is taken to provide some evidence against the theory of mind hypothesis for autism.

As far as I can see, there are various alternative conclusions one might draw from de Roeck and Nuyts' observations:

a) One might question the initial connection between epistemic modality and metarepresentation; alternatively, one could argue that, although this connection is generally valid, the specific items used by the four autistic adults in the study were not actually used to communicate epistemic modality but some sort of non-epistemic modality which did not involve metarepresentation. I think this is actually the case with a number of examples. For instance, de Roeck and Nuyts cite (1) as an example of epistemic modality:[2]

[2] In all the examples I give de Roeck and Nuyts' translation into English.

(1) En *kan 't zijn da* je lever dan nie genoeg werkt als je teveel chocolade eet of nie?
'And *could it be that* your liver does not work enough if you eat too much chocolate or not?'

However, it is possible to analyse this example as a case of root modality using the line of reasoning I have employed for interrogative-initial uses of *can* in English. As a further indication that metarepresentation may not always be involved in so-called epistemic examples, one of the subjects (to whom the utterance belongs) seemed to use the same modal construction *'t Kan (ook) zijn dat* ('it may/can (also) be that') as a set phrase (and often in inappropriate circumstances) in the majority of on-line epistemic judgements she produced. This subject was both the youngest (19 years old) and the one with the lowest IQ scores of the group (68t, 77v). An actual example is (2), where the subject (T) is talking about her not liking a particular boy:

(2) A: With Bart you don't really like it, do you?
T: No.
A: Why? Do you know?
T: I mean but now it is better already, [...] but you cannot do anything about it, do you, when you don't like it?
A: No.
T: *'t Kan ook zijn da* je daar helemaal niets aan kunt doen.
'It may also be that you cannot do anything about it.'

Apparently genuine cases of epistemic modality in T's speech might have been the product of imitation, or simply a place-holder, as the authors acknowledge:

(3) *'t Kan zijn dat* er in de middelste kast daar, plaklint zit.
'It may be that in the cupboard in the middle there, there is some tape.'

b) One might place the autistic subjects whose linguistic production was studied together with that talented minority of autistic individuals (around 20-30%) who pass

the (simple versions of) false-belief tasks, and who have been shown to perform well in a variety of tasks involving metacognition.[3] Such exceptional competence is usually explained in two ways:

b1. Autism might cause a delay in the operation of human mindreading capacities, rather than a permanent and absolute inability to metarepresent (Eisenmajer and Prior 1991, Baron-Cohen 1989, 1995). Depending on the different components which may be taken to form the human mentalising capacity, delay may affect one or several of them at different time-points.

b2. In high-functioning cases of autism, subjects may be capable of performing some sort of mentalising through the usage of alternative strategies. As Leslie and Roth (1993: 103) remark, 'such strategies are arrived at by exercising general reasoning abilities, and hence require a quite high level of such abilities, together with extensive practice and general knowledge, and hence do not appear before adolescence'. Although the exact nature of these strategies is at present not fully known, it has been suggested that they rely on an analogy to the pictorial format for the representation of thought. Pictures as a representational medium, unlike mental constructs, are rather well-understood by autistic subjects; evidence for this is provided by good performance of autistics in variations of the 'false belief' task which involve 'false (dated) photographs' and 'false drawings' (see Leekam and Perner 1991, Leslie and Thaiss 1992, and Charman and Baron-Cohen 1992 respectively). Moreover, there is some tentative evidence which suggests that, whereas normal subjects report their inner experience in terms of inner speech, pictures or 'pure thought', very able autistic subjects describe their mental contents entirely in terms of pictures (Hurlburt, Happé and Frith 1994; cf. Hurlburt 1990). In the small group of autistic people studied by Hurlburt et al., ability to report inner experience in terms of pictures correlated closely with performance on standard theory of mind tasks, independent of IQ. Overall, then, this evidence suggests that high-functioning autistic people may use their understanding of external representations such as pictures to achieve an understanding of mental representations such as thoughts and beliefs.

[3] I am referring to first-order theory of mind tasks. Second-order theory of mind tasks, which involve multiple attribution of belief (*Jane thinks that her mother believes that Bob is at home*) and are mastered by normal children around 6;0 or 7;0, are failed by most of the members of the talented minority of autistic children.

Both the age and the high verbal and non-verbal IQ of the subjects in de Roeck and Nuyts' study corroborate an explanation for their performance in terms of compensatory mechanisms for theory of mind abilities. In the same connection it is worth noting that T., the youngest subject and also the one with the lowest verbal and general intelligence, had markedly greater difficulty in using modal expressions than the rest of the group. Although the authors do not resist this explanation, they maintain that it limits the extent to which the metacognitive device in autism may resemble that in normal subjects. In their view, at least for the best cases of high-functioning autistics, one has to accept that surrogate mechanisms monitored by general intelligence may result in the deployment of a metarepresentational mechanism fully comparable to that of normal individuals.

There is an exception to the overall good verbal performance of these subjects: of the four participants, T. had markedly greater difficulty in producing what de Roeck and Nuyts call 'performative' epistemic modality, i.e. on-line inferential uses of epistemic items to mark the fact that the complement is supported by/compatible with the speaker's current belief-set. Apparently performative uses in T's speech are shown to be deviant and it may not be a coincidence that the adverbial *waarschijnlijk* ('probably'), which is standardly used 'performatively', is absent from her spontaneous production. de Roeck and Nuyts do not consider performative uses metacognitive in any way, since they do not 'involve the representation of people's minds at all' (ibid. p.55) but a simple comparison between a hypothetical situation and the state of affairs in the world. They therefore propose that such uses are handled by a separate cognitive device (a 'control mechanism'), which, although subsumed together with the familiar theory of mind mechanism under a more general principle, is distinct from purely mindreading abilities. Autism, they submit, is a defect in this more general principle, which in turn affects both theory of mind and the control device. The difference in autistic subjects' performance with the performative vs. non-performative types of modality is attributed to the differential success of compensatory mechanisms which are employed by autistics to master these two subtypes of cognitive capacities.

The 'performative' subtype of epistemic modal meaning is essentially what Lyons (1977) termed 'subjective epistemic modality'; it was also the focus of my attention in studying epistemic modality in the previous chapters. To the extent that

these uses involve the mental checking of the speaker's belief-set and the computation of a logical relation between an assumption (the complement of the epistemic term) and that set of beliefs, they are - *pace* de Roeck and Nuyts - a clear case of metacognition. To illustrate: while in various 'non-performative' uses an epistemic mental state is attributed to someone else, or to the speaker at some point in the past as in (4), 'performative' epistemics rely on the attribution of a mental state to the current speaker as in (5):

(4) a. Jane thinks that you are a fool.
b. In her view, marriage is a mistake.

(5) a. This house is, probably, very old.
b. She must be his mother.

If, as I have argued throughout, all of the uses in (4) and (5) involve metarepresentation, why are the utterances in (5) more difficult than those in (4) for able autistic subjects? There are various possibilities here. One strand of explanation could build on the fact that the production of utterances like (4) may be facilitated by memorisation and repetitive experience, whereas that of utterances such as (5) necessarily requires an on-line computation. For (4a) in particular, one may argue that the syntax of complementation will have some facilitative effect for the acquisition of concepts such as *think, believe,* etc. Another possibility is to compare (4) and (5) in terms of their susceptibility to being grasped through a 'picture' analogy: (4) can be understood more readily in imagistic terms, whereas it is difficult to use a picture surrogate for the epistemic state in (5).

To conclude: de Roeck and Nuyts' (1994) data offer an impressive manifestation of the success of very able autistic subjects to overcome the difficulties in their condition and to engage in normal verbal communication. However, they do not offer a counterexample to the theory of mind hypothesis for autism, or an argument for dissociating epistemicity from metarepresentational (more specifically, metacognitive) abilities. A truly critical test case for both hypotheses would be the presence of an autistic child between 4;0 and 12;0 spontaneously producing/understanding epistemic expressions. As far as I know, no such case has been found.

Quite on the contrary, and exactly as the theory of mind hypothesis for autism predicts, early autistic child language is quite impoverished in the use of mental terms. Tager-Flusberg (1993) reports the results of a longitudinal study, in which six children with autism aged between 3;0 and 6;0 were followed for between one and two years; their spontaneous productions were compared to those of a Down's syndrome group of six children of the same productive language level and age (cf. also Tager-Flusberg 1992). Her findings suggest that, while both groups of children talk about perception and mental states of desire and emotion, autistic children make significantly fewer references to cognitive mental states than children suffering from Down's syndrome. Although her data do not include epistemic modal expressions, one may reasonably hypothesise their absence or scarcity from the language of autism (even more so since their full mastery in normal development is complicated and progresses over a rather long period of time).

Chapter Five

Implications for the Semantics-Pragmatics Interface: Polysemy and Conceptual Structure

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5.0 INTRODUCTORY REMARKS

In the previous chapters, I have presented arguments against the view that English modal verbs are systematically polysemous and for the position that they possess a unitary semantics which contextually yields a variety of interpretations through general pragmatic principles. In this chapter, I want to abstract away from the empirical arguments I have employed so far and concentrate on the conceptual underpinnings of polysemy in current linguistic theorising. My main contention is going to be that the phenomenon of polysemy is often not sufficiently circumscribed to qualify as a theoretical category - in fact, there is good evidence to suggest that what various authors have called 'polysemy' is not a natural class. My aim will therefore be two-fold: in the first place, I will seek to limit the scope of polysemy in linguistic semantics; in the second place, I will explore various alternative possibilities for the representation of systematic multiplicity of word meaning in natural language.

As I have already mentioned in chapter 1, the version of the theory of polysemy I am going to focus on is mostly associated with the Cognitive Linguistics program. To repeat an earlier caveat, what I will call the 'Cognitive Linguistic' approach to polysemy is often a simplification, either because the claims I will discuss are adopted by researchers outside the Cognitive Linguistics program, or because the framework is not taken up in its entirety by all the scholars who work within it. Towards the end of this chapter, I will consider alternative theories of polysemy and sketch some directions for future research.

The content of this chapter takes up and expands on certain themes which have surfaced recurrently during the previous discussion of modality. Modal data have been crucial for contemporary theories of polysemy within Cognitive Linguistics (including Cognitive Semantics, Construction Grammar and Grammaticalisation theories) - hence the machinery I have reviewed so far summarises the main aspects of much current theorising about polysemy in general. Nevertheless, a more comprehensive discussion of the phenomenon of polysemy cannot be limited to the results of a single case study; so I will feel free to introduce and briefly examine additional data for which a polysemy analysis has been proposed whenever this is necessary.

The chapter is structured as follows. The first part contains a series of theoretical objections to the theory of concepts which underlies much current theorising about polysemy (mainly of the Cognitive Linguistic variety). The second part focuses on the mental representation of polysemy and examines the distinction between polysemy and either ambiguity or semantic indeterminacy, as well as the psycholinguistics of the on-line comprehension of polysemous items. Towards the end, I present alternative models of systematic multiplicity of meaning and make some suggestions as to the proper treatment of polysemy in studies of linguistic meaning.[1]

5.1 BACKGROUND: THEORETICAL OBJECTIONS

Polysemy is a point of convergence for a variety of theoretical assumptions about the mental representation of word meaning, and leads quite straightforwardly to more general issues about the organisation of human cognition. In chapter 1, I have outlined the treatment of polysemy within the framework of Cognitive Linguistics and illustrated how it connects to foundational issues within the theory; by way of reminder, in the next paragraphs I would like to present the thread of intertwined claims linking polysemy to the theory of concepts using the example of modality.

Recall that at the theoretical core of Cognitive Linguistics lies a commitment to experiential realism as a view of natural language meaning. As standardly presented, experiential realism is as an alternative to an 'objectivist', God's eye view of meaning and concepts, according to which word meaning can be adequately formulated in terms

[1] Versions of the material in this chapter appear in Papafragou (1998d/forth., 1998e/forth.).

of a set of jointly necessary and sufficient conditions (see Lakoff 1987a, 1987b, 1993, Sweetser 1990, Langacker 1987, 1991, Gibbs 1994, and references therein). In contrast to this view, an experiential theory of concepts views them as embodied constructs, which derive their meaning not through their correspondence to objects in external reality but through their link to meaning-conducive human conceptualising capacities and psychological functions. As a result, experiential realism carries a theoretical commitment to a host of related theses, such as the inseparability of language from general cognition (Cognitive Penetrability), the primacy of experience in concept attainment (Conceptual Embodiment), and the structuring of concepts on the basis of schematic mental images (image schemas) and metaphor.

Polysemy analyses make appeal to these assumptions in crucial ways. On the polysemy-based approach to English modals (Sweetser 1990, Talmy 1988, Johnson 1987, Langacker 1991), our understanding of modality in natural language relies on the grasp of a whole force-dynamic conceptual domain/Idealised Cognitive Model (where ICMs are meant to represent the internal structure of a category). This domain is directly experienced through our everyday acquaintance with forces, counter-forces, boundaries, enablement, and so on, i.e. our primary socio-physical experience (cf. Cognitive Penetrability, Conceptual Embodiment). Our knowledge of how forces operate, assembled as a product of this experience (cf. experientialism), is structured by image schemas of a kinaesthetic type (cf. mental imagery). These image schemas are the basis for the root meanings of modals such as *must*, *may*, *can*, etc. On a secondary level, these natural force-dynamic relations are projected in the abstract domain of reasoning and mental activity, in a development which is taken to be characteristic of lexical semantic change (cf. Embodiment). The result is a metaphorical mapping which preserves the image-schematic structure of modality but applies it to a different area. Now force-dynamic schemas operate between mental objects - thus yielding the notions of epistemic possibility or necessity. The motivation behind the synchronic polysemy of English modal verbs (i.e. the metaphorical projection from the concrete, experiential to the abstract domain) also extends to the ontogenetic and phylogenetic development of epistemic meanings in expressions which initially only had root readings.

On this approach, modal meanings form a natural category of senses, related through independently motivated conceptual principles and processes. It will be my concern in the next sections to argue that some of these principles face difficulties, with corresponding consequences for the theory of polysemy they are used to sustain. I concentrate on three major themes: Conceptual Embodiment (5.1.1), mental imagery (5.1.2), and the role of metaphor in conceptual structure (5.1.3).

5.1.1 The Conceptual Embodiment thesis

The view that linguistic meaning is 'grounded' in bodily movement and experience is best summarised by Johnson's (1987) metaphor 'the body in the mind'. Quick reminder: Conceptual Embodiment stems from the assumption that the fundamental innate conceptual resources available to humans consist of the ability to form image-schemas and basic-level categories (the capacity to form ICMs and to project metonymically/metaphorically from concrete to abstract concepts largely relies on these resources).

5.1.1.1 Experience and concept attainment

An immediate difficulty with almost all formulations of the Conceptual Embodiment thesis comes from the vague metalanguage which is used to substantiate it. Lakoff and Johnson (1980: 177), after acknowledging that there are some things which are directly understood via our immediate experience in our environment, go on to point out:

> Many aspects of our experience cannot be clearly delineated in terms of the naturally emergent dimensions of our experience. This is typically the case for human emotions, abstract concepts, mental activity... Though most of these can be *experienced* directly, none of these can be fully comprehended on their own terms. Instead, we must understand them in terms of other entities and experiences, typically other *kinds* of entities and experiences. [emphasis in the original]

And elsewhere (p. 59):

> Perhaps the most important thing to stress about grounding [of concepts] is the distinction between an experience and the way we conceptualize it. We are not claiming that physical experience is in any way more basic than other kinds of experience, whether emotional, mental, cultural, or whatever. [...] Rather, what we are claiming about grounding is that we typically conceptualize the nonphysical *in terms of* the physical - that is, we conceptualize the less clearly delineated in terms of the more clearly delineated. [emphasis in the original]

I think that, in order to fully grasp what Conceptual Embodiment amounts to, one needs to be a lot clearer about what is meant by the following: (a) experiencing vs. understanding; (b) concrete/experiential vs. abstract concept; (c) representational difficulty/complexity. Some clarification is especially called for when claims of such breadth are made: '[metaphoric concepts] structure not just our language but our thoughts, attitudes, and actions' (Lakoff and Johnson 1980: 39). A first approximation to what is meant by the previous passages is this: some concepts (such as emotion concepts, abstract concepts, and the like) are more difficult to grasp than, say, concepts for concrete objects; therefore, only the latter, but not the former, can be directly represented. This interpretation entails that, say, the concept CONTAINER is easier to grasp than the concept LOVE, a prediction that seems acceptable to Cognitive Linguists but rather counterintuitive to me. A second interpretation, which is favoured by Lakoff himself (p.c., cited in Murphy 1996: 190), is that, rather than some concepts being 'difficult', it is the nature of the experience which disallows direct representation. When the experience is poorly structured (as is the case with emotions, for instance), another experiential domain will be used to (metaphorically) provide structure for it. It is not clear how the notion of structure applies to experience - rather than to concepts used to represent experience; in what follows, I will continue to refer to structure of concepts and build on the first interpretation (with its possible construals).

In an attempt to clarify the metalanguage, one might plausibly suggest that the only innate conceptual resources allowed by the Conceptual Embodiment doctrine are strictly sense-based. This is an idea already encouraged by the primacy of basic-level concepts in Lakoff's (1987a) account of concept acquisition; it also seems to accord with the following passages describing the formation of the concepts MORE and PURPOSE through image-schemas and metaphor (Lakoff and Turner 1989: 83):

> [I]n our everyday experience we constantly encounter cases where an increase in substance (e.g., pouring more water in a glass) increases the height of the substance (e.g., the level of the water in the glass). This provides us with a strong experiential basis for the basic metaphor MORE IS UP.
>
> PURPOSES ARE DESTINATIONS has almost as strong a grounding in everyday experience. Regularly, throughout each day, the achievement of certain purposes requires going to a certain location, as in going to get a glass of water... [We] regularly experience the source and target domain together...

What these descriptions urge, then, is that the acquisition of all non-sensory concepts proceeds through inductive generalisation from experience (i.e. perceptual evidence). Although not put in these terms in the Cognitive Linguistics literature, this should be crucially involved in both the formation of image-schematic and basic-level concepts and in the metaphoric/metonymic projection from the concrete to the abstract domain. In a sense, both 'basic' and abstract (i.e. non-sensory) concepts are acquired through learning, in particular through repeated associations in the environment.

If this picture looks increasingly familiar, this is not surprising: what we have ended up with is, I think, a version of the Empiricist account of concepts. According to the Empiricist story, humans possess a primitive conceptual basis which is much smaller than the set of concepts which are lexicalised in natural language; it consists (roughly) of sensory concepts, which are the output of the receptive mechanisms of the organism across the range of inputs that it responds to. Primitive concepts lack any internal structure. In order for a fuller conceptual apparatus to be developed, the organism has to submit the range of primitive concepts to a combinatorial mechanism; the latter is responsible for the construction of all complex concepts. Since this account is supposed to exhaust the concepts potentially available to the human organism, the 'Empiricist maxim' follows: nothing is in the mind except what is first in the senses. As to the precise process of concept acquisition, most Empiricist accounts agree that it amounts to concept learning through hypothesis formation and evaluation, and thus involves the mechanisms of inductive logic (for a fuller account see Fodor 1981: 264ff.).

I think that this convergence of views between Cognitive Linguistics and the Empiricist theory of concepts is far from accidental; for instance, almost any account of

concept acquisition which assumes a set of basic, primitive concepts is bound to consider sensory concepts as plausible candidates for that set. The problem with such accounts is that they have to face the well-known objections to inductive theories of learning, objections which have been raised most forcefully by both Chomsky and Fodor and have served as motivation for strong (albeit very different) innateness theses (for an overview, see Piatelli-Palmarini 1980, 1995).

I will just consider (a version of) what I take to be Fodor's strongest argument against the idea of concept learning (Fodor 1975, 1981) and show that it applies straightforwardly to the Conceptual Embodiment thesis. Consider the previous example of PURPOSE, an abstract concept which, on the Cognitive Linguistics story, should be attained through projection from the image-schematic concept of DESTINATION (itself acquired at a yet more fundamental, sensori-motor level, and thus 'directly'). In order for an individual to acquire the concept PURPOSE, s/he must form the hypothesis 'A PURPOSE IS A DESTINATION OF X SORT' (where the last qualification is supposed to capture extra conceptual material added after the projection of the image-schema of DESTINATION - the exact way of representing the projection is of no particular importance here). *But the hypothesis that is meant to lead to the attainment of a concept already includes that concept*; hence, the concept of PURPOSE should be available to the organism before the process of hypothesis formation (let alone evaluation) has even begun. Fodor's conclusion is that experience cannot lead to the acquisition of concepts which did not already exist in some form or other in the individual's cognitive device; in my view, the above demonstrates at least that there has to be a strong innate predisposition for the formation of certain concepts rather than others - including abstract concepts, which cannot rely for their acquisition on cross-domain projection from concrete concepts.[2]

It appears that the formula 'A PURPOSE IS A DESTINATION OF X SORT' cannot do duty as an inductive hypothesis for concept learning because its first part (the concept PURPOSE) is problematic; I now want to claim that its second part is

[2] The same argument applies to many different aspects of concept acquisition. For instance, Lakoff (1987a) believes that basic-level concepts (e.g. DOG) can give rise, through the (unspecified) working of our conceptualising capacities, to subordinate and superordinate concepts (SPANIEL and ANIMAL respectively). This would involve entertaining hypotheses of the sort: 'A SPANIEL IS A DOG OF X SORT', which again explicitly involve the concept-to-be-acquired and, therefore, presuppose its availability.

problematic as well, to the extent that it relies on the idea of concept decomposition. Notice that an important assumption of the Empiricist story was that all non-sensory concepts can be decomposed into sensory concepts plus some logical syntax. A version of this idea appears in Lakoff's (1987a) account of conceptual structure: for instance, a concept such as PURPOSE decomposes into an image-schema (DESTINATION) plus some extra conceptual material. This is precisely what the qualification 'OF X SORT' was meant to capture in the representation of the concept above. However, the view that concepts decompose exhaustively, i.e. that they can be defined on the basis of necessary and sufficient conditions, has been consistently shown in the past to be misguided (see Fodor 1981: 284ff.). In our example, a fuller specification of the content of PURPOSE would involve spelling out the content of the qualification 'OF X SORT' attached to the concept of DESTINATION. Now any further specification should be something which, added to DESTINATION, would yield PURPOSE; what is more, it should be *external* to DESTINATION and distinct from it. It turns out, though, that no such specification can be adequately formulated; hence, the decompositionalist program collapses. Worse, as Fodor, Fodor and Garrett (1975) have shown, it is *logically impossible* to give any such specification: the property sought (let's call it the property X) has to satisfy two conditions: a) it should be logically independent of the property of being a container, and b) it should be such that SOMETHING IS X and SOMETHING IS A DESTINATION jointly entail SOMETHING IS A PURPOSE. It is easy to see that no such property X can be supplied.

I have given a rather strong formulation of the familiar 'poverty of the stimulus' argument, which presents a problem for classical Empiricist accounts of concepts and, I have claimed, contemporary theories based on Conceptual Embodiment: the only *structures* explicitly assumed to be innate by this thesis are image-schemas, which by definition grossly underspecify all subsequently formed concepts; however, it is very difficult to supplement these basic structuring blocks with some machinery which would flesh them out into full conceptual entries.[3] At this stage, I anticipate an objection:

[3] Indeed, image-schemas are meant to precede (and structure/direct) perception. This is the only step towards acknowledging specific innate conceptual resources that Cognitive Linguistics is prepared to take (and even that is not free of problems, as I argue in the section on imagery).

> Your analysis notwithstanding, one might point out, it is simply misleading to interpret the Conceptual Embodiment thesis as a reintroduction of Empiricism. For one thing, to link Cognitive Linguistics with a revival of decomposition is surprising, given that the theory is offered as an alternative to both the classical view of concepts, on which concepts can be adequately defined, and to the corresponding 'checklist' theories of word meaning (Lakoff 1987a, Sweetser 1990, Gibbs 1994). Lakoff himself (1987a: 164) argues against what he calls 'empiricist objectivist cognition', whose position he summarises thus:
>
> 'We acquire our concepts, that is, the symbol systems that we use in thought, through accurate sense perceptions in such a way that they correspond systematically to entities and categories in the world';
>
> his own views represent an experientialist-nativist position, on which 'at least some concepts are inborn and [...] those concepts mean what they do because we are the kinds of beings that we are, rather than because they correspond to some external reality' (ibid. p.165).
>
> Also, the picture of concept attainment you have presented may not be accurate. In your PURPOSE argument, it is conceivable that one does not have to locate the exact properties which have to come in and flesh out the DESTINATION image-schema to the full-blown concept PURPOSE: it suffices to say that conceptual attribute manipulation of some type takes place before the full concept comes into being. After all, the formation of the abstract concept involves a metaphoric projection across different domains: it is to be expected that some properties will be carried over from one domain (that of physical experience) to the other (that of abstract, non-experiential experience).

This objection won't do, though. Firstly, it is true that Lakoff (1987a) explicitly distinguishes his theory from the empiricist position that language is a 'mirror' of external reality (i.e. that objective correspondences exist between natural language categories and classes of objects in the world), and limits the scope of Cognitive Linguistics to cognition-internal categories and phenomena. Nevertheless, even within the realm of internalist, individualistic theories of cognition, there is room for a variety of stances from the more empiricist to the ardently nativist, depending on the exact sort and extent of 'hard-wired' conceptual resources attributed to the organism. My claim has been that the Conceptual Embodiment thesis lies at the empiricist end of the innateness spectrum, for the only conceptual resources it recognises are experience-led/sensory.[4] The limitations of this approach become obvious if one compares the

[4] It might be interesting to pursue the comparison between experientialism and Empiricism; another point worth mentioning in this connection is that classical empiricists like Hume (unlike modern proponents of experientialism) consider emotion concepts as primitive.

innate conceptual apparatus warranted by Conceptual Embodiment with that adopted by other contemporary theories - a matter I will return to after dealing with the next point.

Secondly, and more importantly, we cannot be content with claims with such breadth and boldness as the Conceptual Embodiment thesis unless it shows how the precise dependencies it postulates among concepts are realised. Since concept attainment offers a solid test-bed for such dependencies, to invoke 'conceptual manipulation of some type' in order to salvage the predictions of the thesis is question-begging. To illustrate: Conceptual Embodiment does not simply claim that one can infer properties of purposes from properties of destinations, or that having the concept PURPOSE somehow cognitively presupposes having the concept DESTINATION - rather, it makes the stronger claim that, using DESTINATION as an image-schematic blueprint, humans construct via their conceptualising capacities the concept PURPOSE. One may indeed attempt to answer the question of how novel concepts get filled in (given that image-schemas underdetermine the output of concept formation) in terms of inter-domain transfer of properties; then, however, the problem is pushed from the level of single *concepts* to the level of conceptual *domains.* Moreover, since the abstract/concrete domain distinction is not explicated, it is not obvious that it solves the problem of furnishing the missing attributes of abstract concepts.

In support of Cognitive Linguistics, one might point out that the theory postulates specific *abilities* which are obviously meant to deal with hypothesis formation and evaluation (such as the 'conceptualising capacities' which are responsible for developing image-schematic and basic-level concepts, as well as for constructing ICMs, and complex or abstract categories). This suggestion, though, does not offer any actual help so long as conceptualising capacities do not actually correspond to innate *concepts* (or conceptual formats): powerful though they may be, these processing abilities *in principle* operate on impoverished representational resources (:image-schemas). It is interesting to note that most current psychological research seems to support a more radical innateness position. On this view, conceptual knowledge is highly domain-specific, i.e. it is organised in terms of evolved, complex conceptual networks which are acquired at different times and in different ways but with a consistency across subjects which militates in favour of strong innate pre-programming

(for an overview, see Bloom 1993, 1995; cf. also Keil 1989, Carey 1991, Carey and Gelman 1991, Hirschfeld and Gelman 1994, Sperber, Premack and Premack 1995). Core areas which appear strongly underwritten by innateness are psychology, geometry, physics and number (Spelke 1995): concepts in these areas are claimed to be part of the organism's initial knowledge which surfaces as early as infancy. None of these developmental facts squares very well with the constraints placed by Conceptual Embodiment.[5]

To sum up so far: it seems that the Conceptual Embodiment thesis yields a somehow impoverished basis for conceptual development. Before rounding off this section, I would like to raise an issue which has been implicit in my discussion of the Cognitive Linguistics approach. The Conceptual Embodiment thesis seems to rely by definition upon a distinction between the mental and the physical/experiential; in other words, it tacitly assumes a rather traditional mind/body distinction, and expects meaning in natural language to be generated by the conceptualising capacities of the mind, albeit grounded in the operations of the body. The difficulty with the mind/body distinction is, of course, that it is barely intelligible, let alone scientifically respectable (at least from a naturalistic perspective; see Chomsky 1993, Warner and Szubka 1994). More specifically: although in general discussion Lakoff (1987a) argues that 'the information-processing system of the body is a joint body-mind system, not factorable into purely mental and purely bodily functions' (p.351) and Johnson (1987) talks about the 'body-in-the-mind', in the course of particular analyses a mind/body dualism creeps back in. Take kinaesthetic image-schemas: Lakoff (1987a) seems to introduce them as a case *par excellence* of something *bodily* (hence the term 'kinaesthetic') which is, nevertheless, instrumental in shaping *mental* constructs (i.e. concepts). The very notion of 'embodiment' presupposes the existence of something coherently called 'the body' (as opposed to what? presumably 'the mind'). Similarly, quite a few other Cognitive Linguistics writings build systematically on the physical-mental (or concrete-abstract, or external-internal) distinction (see Lakoff and Johnson 1980, Sweetser 1990).

[5] The conditions of the Conceptual Embodiment are not always applied equally forcefully in accounting for specific data. Consider the concept PURPOSE again: on anybody's account, INTENTION is a crucial element of PURPOSE. This is captured in the Cognitive Linguistic account through the image-schema of DESTINATION, since the latter is not purely perceptual but tacitly involves appeal to intention. In this way, a non-sensory, abstract (hence presumably 'not clearly delineated') category is presupposed in the analysis.

Consequently, it appears that - claims to the contrary notwithstanding - what the Conceptual Embodiment thesis sets out to show is that the boundary between the physical/bodily and the mental is transcended through a variety of processes and mappings, rather than that such a boundary does not exist in the first place.

5.1.1.2 Predictions and predictive power

In the last paragraphs, I argued that the Conceptual Embodiment thesis is intended to cover actual dependencies between concepts which direct the process of concept formation. One would then expect the theory to be able to make specific predictions in at least two areas: language acquisition, and language-related deficits. To take language acquisition first, the Conceptual Embodiment thesis entails that specific classes of concepts will appear earlier than others almost by definition: image-schematic and basic-level concepts are bound to be acquired early in development, whereas abstract concepts will appear later. As a result, the thesis postulates precise dependencies across concepts/conceptual classes. Take, for instance, the kinaesthetic image-schema of SOURCE-PATH-GOAL. According to Lakoff (1988), this schema is used in the comprehension of primary, experience-based concepts such as DESTINATION (this is a specialisation of the GOAL concept for exclusively spatial end points). At a later stage, the concept of DESTINATION will be used as a basis for acquisition of the concept of PURPOSE (see the passage from Lakoff and Johnson 1980 above). The theory thus predicts a developmental sequence from the concept of DESTINATION to that of PURPOSE. Similarly, on the level of developmental and/or language deficits, one would expect 'natural' classes of concepts to be similarly affected; for instance, an inability to use figurative language (manifested, among others, in autistic subjects) should coincide with an inability to handle concepts which involve metaphoric or metonymic projections - in fact, by definition, all abstract concepts. The question now arises whether these predictions are borne out.

As far as I know, not much attention has been devoted to the Conceptual Embodiment thesis within psycholinguistic research (and, in fact, as I mentioned above, a lot of current writings on conceptual and linguistic development propose much richer candidates for innate status). Of course, the assumption that basic-level concepts

appear early in development does have considerable empirical backing, but this assumption was established independently of Cognitive Linguistics and is not theory-specific. When one examines certain theory-bound predictions, such as the precedence of JOURNEY and DESTINATION over LOVE and PURPOSE respectively, then things become less straightforward; I chose these two examples because it seems to me that they stipulate particularly unlikely dependencies. More robust examples come from emotion concepts, which are again claimed to be impossible to grasp directly (Lakoff 1987a, Lakoff and Johnson 1980, Kövecses 1990, Dirven 1997); the concept of ANGER is thus standardly analysed as PRESSURE IN A CLOSED CONTAINER, a metaphor which underlies expressions such as the following:

(1) a. He flipped his lid.
b. The pressure built until he exploded.
c. He couldn't hold in his anger anymore.

However, as Ortony (1988) and Harris (1989) have shown, anger and other emotions are experienced by children much earlier and much more extensively than the domains supposedly used to structure them. Since the Conceptual Embodiment thesis urges precisely the experiential basis of thought, one would expect the concepts for emotions to be represented/grasped directly via our emotional experiences, rather than in terms of more 'concrete' concepts.[6] What is more, as reported in Wellman (1990), there is some evidence that children can already reason about emotions around the age of three or four. This implies that whatever metaphorical or other mappings are necessary in order for these concepts to be acquired should have taken place before that age. Although this is obviously an empirical issue, it is highly improbable that children that young have at their disposal complex concepts such as PRESSURE IN A CLOSED CONTAINER, and even more so that the development of such concepts is necessary in order for simple concepts like ANGER to be acquired. In any case, the onus of proof seems to rest with the view that emotion (and, generally, abstract) concepts are

[6] For reports of children's early reference to emotions, see Schwartz and Trabasso (1984), Kauschke and Klann-Delius (1997) and references therein. Cf. also Murphy (1996).

relatively difficult to represent, and this is not an issue which can be settled by definition.

Similar comments can be made for cases of cognitive and/or linguistic deficits. If the acquisition of a variety of concepts crucially rests on repeated environmental associations (Lakoff and Johnson 1980), then inability to form such associations should heavily restrict the final output of the human conceptualising capacities. Evidence from blind children suggests otherwise. As Landau and Gleitman (1985) report, in order to capture the ability of congenitally blind children to deploy a rich system of concepts (and word meanings), one should posit a rich innate conceptual endowment, which goes well beyond what Cognitive Linguistics and the Conceptual Embodiment thesis provide; the two researchers, placing themselves within a larger tradition of investigators, describe the candidates for innateness as 'categories which are remote from sensation' (p.178). Similarly, children suffering from autism have manifest deficiencies with figurative language, for instance, creative metaphor (Baron-Cohen, Tager-Flusberg and Cohen 1993, Happé 1994). To my knowledge, though, there is no evidence to suggest that this feature is coupled with an inability to handle abstract notions such as temporal or emotion concepts (TIME, LOVE, etc.) - although, on the Conceptual Embodiment thesis, the derivation of abstract concepts crucially involves metaphorical mappings from the concrete, experiential level.[7]

Let me summarise what I have done in this section. I have initially argued that there are a number of vaguenesses in the theoretical foundations of the Conceptual Embodiment thesis. I have proposed one plausible way of clarifying the metalanguage, as a result of which the experientialist position leaves open certain questions about concept attainment. Finally, I have suggested that the theoretical framework

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[7] This is not, of course, to say that the experience and expression of emotion in autism doesn't differ dramatically from the normal case (since the defects in mind-reading affect emotional state and expression: see Harris 1989: 193ff.).

It is sometimes pointed out that the aim of the Conceptual Embodiment thesis is not prediction but rather motivation, i.e. a (post hoc) explanation of the directionality of mappings in figurative expressions, polysemy, and so on (Lakoff 1987a, Lehrer 1990). In fact, not all adherents of experientialism consistently limit the predictive power of the theory. To mention just one example, in her analysis of the English modals, Sweetser (1990) is happy to find that the meanings she takes to be basic (the root meanings of obligation, permission, etc.) are acquired earlier by children than the derived, epistemic meanings (possibility or necessity based on evidence); here, the directionality of the mapping from the concrete (root) to the abstract, mental (epistemic) world is taken seriously and is used to correlate synchronic polysemy to acquisitional facts. This is precisely the sort of empirically testable predictions which could positively supplement the Conceptual Embodiment thesis (although for a reanalysis of the acquisitional data from modality, see chapter 4 above).

occasionally fails to generate the right predictions. I will now build on the discussion of Conceptual Embodiment in order to illustrate some problems vis-à-vis imagery and metaphor.

5.1.2 Mental imagery

My arguments in what follows concentrate on the Cognitive Linguistics notion of image-schemas and their role in the formation and exploitation of the mental lexicon; they are applicable, however, to other holistic models of the lexicon which attribute a pivotal role in structuring concepts to perceptual blueprints (see Barsalou 1993, Barsalou, Yen, Luka, Olseth, Mix and Wu 1993, Jackendoff 1996).

To recapitulate: image-schemas, in Lakoff's (1987a) original model, are abstract preconceptual structures which organise perception and more advanced (:detailed) kinds of mental imagery (see p.444ff.). They are specifically distinguished from two types of detailed mental images which are recognised within Cognitive Linguistics: context-bound specific conscious effortful rich images, and conventional images. The first type has already been the subject of a number of studies in cognitive psychology, most notably by Shepard, Kosslyn and their co-workers (Lakoff cites the work of Shepard and Cooper 1982, Kosslyn 1980, 1983): such studies have posited the existence of a mode of mental representation which is distinct from the propositional mode familiar from algebraic models of the computational mind. The thrust of such research has concentrated on subjects' performance in a number of experimental tasks that (arguably) involve the formation and manipulation of mental images: e.g. scanning, rotation, etc. Lakoff's characterisation of the mode of presentation of this imagistic information captures the fact that the pictures formed were related to a specific object the experimenters presented to the subjects (context-bound/specific), they were set up and handled through conscious and concentrated effort (conscious and effortful), and included a considerable amount of representational detail (rich).

Conventional images are mental images which are rich but not effortful: they are constructed automatically and unconsciously. They also lack the properties of specificity and context-boundedness: one can, upon request, bring to mind the image of a ball without that object being present in the immediate physical environment. One

might argue that, among other things, conventional images are the means of representing knowledge of prototypes for a given category, i.e. typical members of categories, social stereotypes and the like, which demonstrably play an important role in object classification and goodness-of-example judgements. On Lakoff's view, images of prototypes are conventional since they appear to be pretty much the same across the members of a given community. By the same line of reasoning, conventional images are involved in representation of the meaning of so-called 'imageable idioms' (ibid. p.447), such as *to keep someone at arm's length*, *to spill the beans*, and so on (see also Gibbs and O'Brien 1990).

Image schemas resemble conventional images, but are neither rich nor specific. Their function is to structure rich mental images and perception. According to Lakoff (ibid. p.453-5), our ability to judge whether a given sentence (say, *The plane is flying over the hill*) fits a (perceived or imaginary) scene (here, a scene of a plane flying over the hill) depends on the closeness of fit between (a) the image schemas associated with lexical items in the sentence, and (b) the image schemas that structure the perception/imagination in which the scene appears. In the example mentioned, the image schema structuring the preposition *over* should correspond to the image schema structuring the perceptual/imagistic representation of the spatial position of the plane.[8]

I have two sorts of worries about the notion of image schemas. The first has to do with the solutions these schemas urge with respect to purely linguistic issues such as word meaning and compositionality. The second concerns the relationship of image schemas to perception. I will discuss them in that order.

5.1.2.1 Linguistic considerations

Several of the questions which arise in the mental imagery domain (both of the Cognitive Linguistics and of more standard varieties within cognitive psychology) connect to the fact that the current state of the art has not yet reached a satisfactory level of precision. Most discussions complain about the lack of terminological clarity (cf. Sterelny 1990, Block 1990); moreover, several researchers have pointed out the

[8] I have mainly concentrated on Lakoff's ideas about image schemas; other researchers working in this area are Talmy (1988), Langacker (1987, 1991), Lindner (1981), Fauconnier (1985, 1997), etc.; see also the papers in Fauconnier and Sweetser (1996), and Nuyts and Peterson (1997).

difficulty of restating issues or problems traditionally dealt with in propositional terms within an imagistic framework. The first range of difficulties I will consider stems from the apparent incompatibility of image schemas with well-founded requirements on semantic representations (which present no problems for propositional representations): if image schemas are assumed to structure meaning-bearing items such as words or sentences, then they should obey such requirements. The problem is that, at least as I interpret them, image schemas are incapable of doing so.

Consider a word like *container*. Since there is a CONTAINER image-schema, it makes sense to think that the meaning of the word is given by that image schema (or, in the weak case, that the image schema gives rise to various instantiations of the concept CONTAINER within a single ICM, depending on extra features the schema takes on - for size, shape, colour, etc.). Now what about the complex expression *cheap container*? Compositionality requires that the complex concept CHEAP CONTAINER be reconstructible from its constituent concepts plus regular combinatorial possibilities for concepts. The question that arises now is: how can an image-schematic component of meaning combine with a non-imagistic one in the formation of complex concepts? Assuming that CHEAP is not structured by an image-schema, but is a regular building block of propositional structures, how can it combine with CONTAINER to yield a coherent representation? Furthermore, what *is* the form that the ultimate representation will assume? Is CHEAP CONTAINER going to be a propositional or a pictorial concept? I am not particularly concerned with the accuracy of the specific example: maybe there is a way around that. My point is rather more general: to the extent that there are aspects of propositional structure for which an imagistic account has not yet been formulated (and is not forthcoming), it is difficult to see how some well-established requirements on semantic representations can be satisfied by 'mixed' structures. That there has to be some division of labour between pictorial and propositional modes of representation is made particularly manifest by phenomena such as negation, quantification, tense, and so on, which do not lend themselves very easily to an image-schematic treatment, whereas they can be dealt with straightforwardly by existing propositional models. To the extent that some areas are recalcitrant to a reanalysis in imagistic terms, the trouble with compositionality will persist.

As a matter of fact, problems of semantic composition appear not only on the sentence level but on the word level as well. Consider again the concept PURPOSE. I have previously concentrated on the difficulties of offering a plausible decompositional analysis for the concept; now I want to turn to another aspect of the process of breaking down the concept into its parts. One of these parts is the image schema for DESTINATION; what about the conceptual material which is assumed to flesh out the concept PURPOSE? If it is not of pictorial format itself, it is difficult to see how it would coherently combine with the image schema to yield the full-fledged concept of PURPOSE. If it is of pictorial format, then we are back to the problems of compositionality on the sentence level.[9]

Compositionality is not the only reason why image-schematic representations might fail to do duty as semantic representations. Another reason has to do with the fact that image schemas, like all pictures, are bound to be characterised by a considerable degree of indeterminacy. This is admitted in Lakoff's original (1987a) formulation, which stresses the *schematic* nature of what he takes to be basic structuring devices in cognition and perception. The issue now is: how does one know what a given schema is a schema *of*? Presumably a U-like image schema could be meant to represent a container, but it could equally well represent a diverted path, a hole or a hill viewed upside-down. In most psychological accounts of imagery it is acknowledged that similarity between the object of representation and its mental image is too simple a criterion to constrain what a mental image is an image of (Block 1981a); in other words, images have to be entertained under a description, i.e. as images *of* an object. This solution does not apply to image schemas, however; they are not products of the intentions of a thinking agent who can indeed view them as images of something. According to Lakoff, image schemas are preconceptual, non-intentional structures, so it is not entirely clear how they manage to refer. Given their abstractness and the fact that they radically underdetermine fuller concepts (and percepts), one might be tempted

[9] Consider a parallel: on one interpretation, prototypes are mental images of representative members of a category (Lakoff groups them under conventional images). However, prototypes cannot easily function as word meanings because it is unclear how they could conform to the compositionality requirement (as Lakoff himself has argued - see Lakoff 1987b and Fodor and Lepore 1996). Although no connection is usually made between the imagistic nature of prototypes and the failure to obey compositionality, the two properties might be connected. If true, this would be a situation similar to image-schemas: in both cases traditional properties of propositional representations would be hard to translate into representations containing imagistic structural elements.

to think that a device should exist for interpreting these schematic constructions as blueprints for this or that concept (or percept). This line of reasoning, though, would lead one to acknowledge the existence of a homunculus inside the human organism, whose task it is to 'interpret' image schemas and flesh them out into fully developed concepts.[10] The idea of a homunculus, of course, hardly makes sense in cognitive psychology (see the contributions in Block 1981b, Lycan 1990). Still, it is hard to see how else to conceive of the way image schemas are meant to function.[11]

Lakoff's proposals themselves occasionally seem to rely on the existence of a homunculus. At one point, he maintains that image schemas do not always appear in the form of individual dot-matrix images; motion, for instance, would come out as a property of a sequence of such images, without occurring in any individual image (1987a: 455-6). Another example is the image schema involved in grasping what is meant by *over* in *Sam lives over the hill*, which represents 'an understood path that goes over the hill'; according to Lakoff, '[s]uch an understanding may be part of what is perceived or imagined, but it is not in a dot-matrix representation [as more standard work on imagery would have it]' (ibid. p.456). In both cases something like a homunculus is needed, firstly to superpose an image schema for motion and secondly to ensure that the image schema for movement along the path, although not explicitly represented, is somehow activated and contributes to the comprehension of the utterance. If one wants to avoid the idea of a homunculus at all costs, I can see no other solution than to admit that image schemas can function in more than one way: (a) as basic structural elements of imagistic representations (as I have so far assumed them to be); and (b) as properties/functional roles of an imagistic representation, which are not recoverable just by looking at the representation (see the *over* case); (c) as relations/functions which organise a series of imagistic representations and are not recoverable just by looking at individual members of the series (see the motion case). Notice that, in this tripartite definition of image schemas, part (a) defines them as representations/elements thereof, while parts (b)-(c) define them as functions. There is

[10] Alternatively, one might construct a causal account, in which an image schema would be mobilised en route from the sensory input to the coneptual representation; on this account, indeterminacy would arise 'in context' for the concept-assigning device. However, this is not an accout Lakoff would endorse, since he does not seem to consider image schemas to be distinct enough from concepts. (I am indebted to Deirdre Wilson for comments on this point).

[11] I have already discussed the problems caused by the underdetermination of full concepts by image schemas for concept acquisition, and I won't repeat the point.

an element of inconsistency here, I think, or at least a point that needs clarification. I am only concerned with linguistic implications in this section; thus, suffice it to point out that, since image schemas have, among other things, a semantic role to play (in structuring word meanings), one needs to be a lot clearer as to what precisely these amount to before they can be employed in a theory of meaning.[12]

5.1.2.2 Image schemas and perception

The connection between mental imagery and perception, visual perception in particular, is well-established in all versions of pictorialism in cognitive psychology (see Kosslyn, Pinker, Smith and Schwartz 1981, Schwartz 1981, and the overviews in Block 1990, Sterelny 1990). What sets the Cognitive Linguistics tradition apart is the claim that image schemas, apart from being basic building blocks of concepts, are also innately available as constraints on the sorts of *percepts* we construct. So, the claim goes, image schemas are preconceptual elements, which contribute to the construction of parallel (or at least compatible) structures in perception and cognition. It is precisely due to this role of image schemas that the possibility exists for linguistic descriptions to match (to a greater or lesser degree) a perceived or imagined scene.

The claim that perception is structured by image schemas is not always presented with equal consistency. For instance, the theory seems to lapse into circularity when it is argued that 'image schemas are a reflection of our sensory and general spatial experience' (Lakoff 1987a: 443): if they *reflect* such experience, how can they simultaneously shape it? Furthermore, it is argued that image schemas structure not only vision but also other types of perception; so apart from vision-oriented image schemas, there are olfactory, kinaesthetic, gustatory image schemas, and so on. The nature of all these other types of image-schematic structures is, however, rather obscure (as conceded by Lakoff himself). Take an auditory image schema: we cannot easily see what sort of information it would contain, and how it would structure either auditory input or auditory (non-propositional) mental 'images'. It

[12] Suppose we grant that (the meanings of) at least some concepts are imagistic representations: it would still be hard to see how the same line of reasoning could be applied to (the meanings of) sentences. Take *Sam lives over the hill* again: if we maintain that the thought the utterance explicitly expresses is an image (as Lakoff's writings seem to suggest), this will reintroduce the problem of the indeterminacy of pictures with greater force.

is probably no coincidence that there is very little in the literature on 'rich' non-visual mental images themselves, although their existence is often acknowledged (Schwartz 1981).

When we get to kinaesthetic (movement-based) image schemas, things become even less clear. Consider the domain of force-dynamic image schemas, which includes COMPULSION, BLOCKAGE, COUNTERFORCE, DIVERSION, REMOVAL OF RESTRAINT, ENABLEMENT, ATTRACTION and so on (Johnson 1987: 45-47; cf. Talmy 1988, Sweetser 1990), and is activated in the comprehension of the following examples:

(2) a. The enemy forced us to retreat.
b. Something is blocking my view.
c. There was pressure from both parties.
d. We had to go around the mountain.
e. Children are allowed in the exhibition.
f. You can leave now.
g. I find your wife very attractive.

Now the claim is that such image schemas structure not only fuller concepts like the ones involved in the utterances in (2), but also perception - and this is where unclarity sneaks in: according to Lakoff, these schemas structure not kinaesthetic perception (as one would expect) but 'bodily movement' itself. There are all sorts of objections to this suggestion, the most obvious being that it subsumes two very different things, let's say movement patterns and cognitive patterns, under a single source. The type of (innate) preconceptual structure which can impinge on anything from concepts to perceptual input and bodily movement is a very mixed bag indeed.

To illustrate just how mixed it is, I want to go back to the more straightforward, vision-related image schemas. Since image schemas structure both percepts and concepts, and can provide the metric for closeness-of-fit judgements between visual and linguistic (conceptual) representations, I assume that visual/perceptual input and conceptual structure are isomorphic to a considerable extent (enough so that commonalities in image-schematic structure can be detected);

this result is also supported by the Cognitive Penetrability thesis, on which there is no specialised linguistic faculty with its own proprietary data-base. Now any arguments against such an isomorphism would automatically question the validity of image schemas as bridges between language and vision. I will discuss one simple argument for the difference between the output of the perceptual transducers and the conceptual representations in the 'central systems'. Let's assume (with Fodor 1983, and most cognitive psychologists) that what I have called the 'output of the perceptual transducers' is actually layered and consists of a sequence of transformations of the initial representation of the perceptual stimulus. As far as I understand Lakoff's claim, it amounts to saying that it is the *initial* representation of the stimulus which is shaped by image schemas. So the process of perceiving, for instance, a ball in a basket includes the following sequence: a) an initial image-schematic stimulus representation (in terms of the CONTAINER image schema); b) various stages of transformations, during which the abstract image-schematic structure is filled out; presumably, stage (b) is further processed to yield a full-fledged conceptual representation. The latter would be very similar to the output of the process of comprehending the utterance *The ball is in the basket.* Now, given that the original output of the transducers and the final conceptual representation are separated by various stages of transformations, it is not immediately clear that any isomorphism - however crude - exists between them. Well, one might say, maybe the isomorphism holds between the *final* output of the perceptual transducers (:the endpoint of transformations) and the full-fledged conceptual representation: that is, maybe image schemas shape the uppermost levels of perceptual processing.[13] This is more plausible, but it follows from nothing in Lakoff's (1987a) work, which seems to favour the stronger view about the role of image schemas in perception. There is another possibility, one could insist: it might be more accurate to view the isomorphism as occurring between the initial, crude form of the visual input, and our *preconceptual* resources, our building blocks for concepts, as it were. This could be seen on one level as a truism, since what our concepts look like has to be - to some degree - determined by constraints imposed initially by low-level perceptual mechanisms; construed as a non-trivial claim, however, this would imply

[13] Fodor (1983: 97) suggests that this is the level on which basic-level categories structure the output of the visual systems. Recall that Lakoff (1987a) considers both image-schematic and basic-level categories as constraints on perceptual (and conceptual) representations.

that the *crucial* properties of our cognitive repertoire (image schemas), which have implications for higher-level conceptual capacities (e.g. the employment of abstract categories through image-schematic mappings), are also present in the form of general constraints on low-level visual representations. Although low-level visual representations are better candidates for being structured by underspecified devices such as image schemas than our preconceptual apparatus, the claim that there is exact duplication of structuring devices across these different cognitive areas needs considerable arguing for.[14]

The motivation for image schemas lies in the fact that they are responsible for matching linguistic with non-linguistic (pictorial) representations. As a final argument, I want to point out that image schemas are not the only explanation available for the possibility of detecting closeness-of-fit between representations in different modes. As long as we posit an intermediate level of representation, in which both perceptual and linguistic input are 'translated' into a common format, such comparisons are performed unproblematically. Take the language of thought hypothesis, the clear opposite of a pictorial representational system: this hypothesis can handle issues of integration and/or comparison of different sorts of information through the operation of a central interfacing device which gathers information from the sensory modules on the one hand, and the linguistic module on the other. The similarities between the experience of seeing a mountain and the experience of understanding the utterance *I see a mountain* can be explained on the basis of a common underlying conceptual representation in the language of thought in the absence of any assumptions about the image-schematic structure of either perception or cognition.

5.1.3 Metaphor and conceptual structure

I now want to move on to the assumption that the structure of many concepts is metaphorical. The claims about metaphor can be interpreted in either of two ways, a

[14] Two points are worth mentioning. Firstly, isomorphism does not always involve exact duplication of structure, but Lakoff's discussion encourages this strong construal. Secondly, a crucial argument for the motivation of image schemas is that the experience of looking at a ball is similar to the experience of thinking about a ball (i.e. bringing the concept BALL to mind). However, it does not necessarily follow that the representations involved are in both cases couched in a pictorial medium: after all, the postulated level of similarity cannot be subject to inuition, since image schemas are supposed to function unconsciously.

strong one and a weaker one; I will briefly consider arguments for and against each of them.[15]

5.1.3.1 The strong view on metaphor

On the strong interpretation, which is the one favoured by the writings of Lakoff (1987a), Johnson (1987), Lakoff and Johnson (1980), Lakoff and Turner (1989), Gibbs (1994), etc., there is a big class of concepts which have no independent structure; as it is standardly put in the Cognitive Linguistics literature, these concepts 'cannot be directly represented'. This class includes abstract concepts, emotion concepts, concepts describing mental activity, and so on, which all rely on other, 'experiential' concepts to provide them, through a metaphorical mapping, with internal structure (attributes and values).

Consider the metaphor AN ARGUMENT IS A CONTAINER, which is exemplifed in the following utterances (Lakoff and Johnson 1980: 92):

(3) a. Your argument doesn't have much content.
b. That argument has holes in it.
c. Your argument is vacuous.
d. I'm tired of your empty arguments.
e. You won't find that idea in his argument.
f. That conclusion falls out of my argument.
h. Your argument won't hold water.
g. I still haven't gotten to the core of his argument.

On the strong metaphorical representation thesis, the concept ARGUMENT lacks any content independent of the concept CONTAINER. CONTAINER is an image-schematic concept which, after being metaphorically mapped onto the ARGUMENT concept, gives the latter its structure: an argument is thus understood as something which has content, depth, substance, which contains points, and so on. When we think about (the content of) arguments, we effectively use our knowledge of containers.

[15] Cf. Murphy (1996), who also detects problems for both versions.

The question which arises now is this: If all the entry for ARGUMENT includes is a set of mappings to properties of the concept CONTAINER, then what is there to stop various incorrect mappings from being performed? For instance, within the metaphor offered for (3), I might assume that arguments are solid artefacts, that they are occasionally made of plastic, that they come in various sizes, and so on. Obviously, not all properties of containers will be mapped onto the structure of arguments, but nothing in the theory so far serves to place a principled constraint on the mapping process.[16] Notice that it is misleading to rely on what we already know about arguments to exclude possible mappings: to refrain from attributing to arguments size (a property of containers) on the basis that arguments just *are not* the sort of things which have size is to beg the question. It is precisely the concept-sustaining mapping from CONTAINER to ARGUMENT which is supposed to provide the knowledge of exactly what an argument is.

The strong view of metaphoric representation has further undesirable consequences. It often turns out that the attributes of the concept used for the grounding have themselves to be metaphorically structured. Consider the metaphor LOVE IS A JOURNEY (see chapter 1); the concept JOURNEY includes the attribute EVENT, which - being an abstract concept itself - needs to be grounded metaphorically (cf. the suggestions in Lakoff 1993). This entails that, in order to grasp the concept LOVE, one has to entertain a chain of metaphorical groundings, or mappings, for virtually all those attributes of the concept which cannot be 'directly understood' - a strange conclusion, and one which necessitates multiple embedded mappings for the comprehension of relatively simple, everyday concepts such as LOVE. For these reasons, the strong view of metaphoric representation cannot be easily upheld.

5.1.3.2 The weak version

There is a weaker construal of the claims about metaphoric representation which, although departing from the original proposals made within Cognitive Linguistics, can

[16] In a similar spirit, Murphy (1996) observes that these metaphorical mappings do not fit the definition of 'pointers', standardly used in theories of mental representation to describe properties of a given concept.

be used as a fall-back position. On this weaker view, all concepts are understood directly. However, the content and structure of abstract concepts, emotion concepts, and other selected concepts, is somehow causally influenced by metaphorical mappings to concrete, experiential concepts (Murphy 1996). In other words, direct understanding for the selected class of concepts can only be incomplete. The entry for ARGUMENT will thus be a skeletal construction, with a lot of slots to be filled in via the mappings to other concepts (e.g. CONTAINER). From the initial entry, one can draw basic inferences, such as that arguments are verbal exchanges between people, or that they involve disagreement, but little else. The main inferential potential for the concept ARGUMENT is provided by its metaphorical connections to other concepts; for instance, the assumption that an argument may contain certain points, while it may omit others, will fall out of the mapping to the CONTAINER concept.

Various questions can be raised for this weaker view of metaphor. Firstly, the idea of a skeletal structure for concepts needs to be more concretely fleshed out before it can yield a respectable alternative to the radical strong view on metaphor. Secondly, since now even abstract concepts have some independent content, what is there to motivate mappings to concrete concepts? This question obviously relates to, and depends for its answer on, the previous issue about the skeletal structure attributed to the selected class of 'impoverished' concepts. Can one tell, just by looking at a specific concept, whether its internal structure is rich enough so as not to warrant metaphorical mappings to experiential concepts? Here, as well as in the stronger view on metaphor, one seems to presuppose something close to the existence of a homunculus inside the brain, who is going to regulate metaphorical mappings in cases of insufficiently understood concepts (recall that a 'homunculus' problem cropped up also in the discussion in the previous section; there, it concerned the structuring of simple, directly understood experiential concepts from image-schematic blueprints).

The third, and most important problem so far for the weak thesis is the motivation behind the specific metaphorical mappings it postulates. If it is true that certain concepts are structurally impoverished, what determines the precise metaphorical mappings which are to ascribe to them a more substantial structure?[17]

[17] Murphy (1996) suggests that specific metaphorical projections are determined on the basis of feedback from idioms or collocations; for instance, the way people talk about arguments, as exemplified in (3), would prompt the metaphor AN ARGUMENT IS A CONTAINER. I think this

Similarly, once a specific mapping is established, what determines the specific attributes of the 'parent' concept which will be carried over to the skeletal one? The latter question is inherited from the stronger view on metaphoric representation, and raises essentially the problem of constraints on metaphorical projections across conceptual domains.

One suggestion that may serve as a constraint on the formation of metaphoric projections is Lakoff's Invariance Principle (Lakoff 1990, 1993). The Principle states that metaphorical mappings preserve the image-schematic structure of 'parent' concepts, in a way consistent with the inherent structure of target concepts. In the metaphor AN ARGUMENT IS A CONTAINER, the image-schematic structure of the CONTAINER concept (which includes attributes such as INTERIOR, EXTERIOR, BOUNDARY, etc.) will be mapped onto the ARGUMENT concept in a way which will not violate the latter's initial structure. This is not to say that copying takes place; Lakoff intends the Invariance Principle to be seen rather as 'a constraint on fixed correspondences' (Lakoff 1993: 215) or, as I interpret it, as a constraint based on underlying similarities among concepts.

Still, the new Principle leaves many questions unanswered. An immediate difficulty comes from the vagueness surrounding notions such as 'fixed correspondences' or 'inherent structure' of concepts; even within Cognitive Linguistics, it is acknowledged that such formulations need a lot more clarification (see Brugman 1990). Furthermore, some parts of the novel proposal seem to contradict previous views on the metaphoric representation of concepts; for instance, the assumption that the concept for ARGUMENT is to be causally influenced by the concept CONTAINER in a way consistent with its inherent structure presupposes that ARGUMENT *is* already inherently structured, and in such a way that that structure can impose constraints on further mappings. This contradicts earlier claims about the skeletal structure of abstract concepts.

A final problem which the Invariance Principle does not address is the possibility of having different metaphors for a single concept. As is often noted in the

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reverses the issue, though: what Cognitive Linguistics set out to explain in the first place was the conceptual motivation behind such examples. So, although some causal connection might be projected backwards from idioms, etc. to the conceptual mapping, it is the possibility of forming the mapping that has to be explained beforehand.

literature, a single concept may have multiple constitutive metaphorical groundings. In our example, apart from the container metaphor, arguments can also be understood metaphorically in terms of journeys, buildings, or wars, as is shown in (4), (5) and (6) respectively (Lakoff and Johnson 1980: 90, 98, 4):

(4) a. We have set out to prove that bats are birds.
b. We have arrived at a disturbing conclusion.
c. So far, we've seen that current theories will work.
d. We will proceed in a step-by-step fashion.

(5) a. We've got the framework for a solid argument.
b. If you don't support your argument with solid facts, the whole thing will collapse.
c. With the groundwork you've got, you can construct a pretty strong argument.

(6) a. Your claims are indefensible.
b. He attacked every weak point in my argument.
c. His criticisms were right on target.
d. I demolished his argument.

According to the authors, these metaphors represent different ways of thinking about arguments; in different terms, they can be seen as possible sources of inferences from the ARGUMENT concept. The difficulty posed by multiple metaphors is that they give rise to many different, potentially conflicting inferences: with respect to ARGUMENT, the inferences licensed by the causal-structural role of WAR are very different from those licensed by the role of BUILDING. Moreover, if the concept of ARGUMENT is inherently structured in such a way as to share a fixed, image-schematic correspondence with each of the concepts WAR, BUILDING, CONTAINER and JOURNEY, then (a) its inherent structure cannot simply be a skeletal construction with minimal content; and (b) this inherent structure cannot be unique, but should be comprised of various image schemas (which, in its turn, raises the question of how

these got there in the first place). Notice that these problems would not arise if metaphor were not expected to play a causal role in the structure of concepts, but operated on a secondary level as a relation between independently established conceptual entries.

Other considerations might also be worth mentioning here, but I think what has been said so far serves to make the point.[18] If one accepts concept-constitutive metaphors, either as the sole basis or as the richer part of conceptual structure (i.e. either in a strong or a weaker formulation), one has to somehow constrain the mappings both across and within concepts, so that empirically unverified mappings do not occur.[19]

5.2 POLYSEMY AND MENTAL REPRESENTATION

Taken together, the set of claims about the theory of concepts which I have considered so far has implications for more specific approaches to word meaning. In this part, I will explore some of these implications while examining certain aspects of current accounts of polysemy. I will also go on to make some suggestions as to how polysemy may best be viewed in studies of linguistic meaning. I start by assessesing some criteria for determining whether systematic multiplicity of meaning should be attributed to polysemy, ambiguity or semantic indeterminacy.

5.2.1 Criteria for polysemy

As I mentioned in the begining of this thesis, it is a clear and widely recognised fact

[18] For instance, as Murphy (1996) points out, the Cognitive Linguistics account of metaphor faces circularity of evidence: the only data employed both as initial motivation and as a testbed for predictions are linguistic, and resemble the examples given in this section. A general theory of metaphoric representation should, however, bear on a variety of other empirical domains such as problem-solving, object recognition, memory, and so on, and it would be useful to see some evidence supplied by these domains.

[19] Another process which, together with metaphor, creates polysemic structures is metonymy; on the Cognitive Linguistic account, metonymy involves intra-domain rather than inter-domain mappings of conceptual attributes (see Fauconnier 1985, Lakoff 1987a, Langacker 1993, Gibbs 1994; cf. Nunberg 1978). I have provided an alternative analysis of metonymy in Papafragou (1995, 1996b) and will not repeat the arguments here.

about natural language that a lexical item may convey different, though often related, meanings in different contexts. However, there is considerable disagreement within linguistic semantics as to the optimal way of handling the phenomenon of systematic word meaning multiplicity. In general, linguistic theory offers three main options. The more parsimonious option is monosemy (sense abstraction or semantic indeterminacy), i.e. the postulation of a core underlying meaning from which the range of contextual readings will be derived through pragmatic processes. The second, rather extreme option is ambiguity (or homonymy), i.e. the postulation of distinct entries for every distinct meaning of the term, regardless of their relatedness. The third option is polysemy, i.e. the postulation of a network of senses connected through general conceptual/linguistic relations, which may not be reducible to a single, more basic meaning. One of the main challenges for lexical semantics is to discover a principled way of drawing the three-way distinction between monosemy, ambiguity and polysemy. Another is to clarify what the three options amount to in terms of on-line processing. In this section, I will concentrate on the first of these problems; in the next section I will deal with the second.

In principle, one might want to maximise the amount of monosemy within the lexicon on purely methodological grounds. Semantic parsimony of the familiar occamistic type certainly militates in favour of abstractionist analyses. In view of this principle, polysemy and/or ambiguity should be restricted to cases where a monosemy account is clearly impossible. However, not all authors would agree that the mere feasibility of a monosemy account guarantees its psychological reality; very often, there are further criteria which can be used to adjudicate between equally feasible and descriptively equivalent semantic proposals.

As far as the distinction between ambiguity and polysemy is concerned, probably the most frequently mentioned such criterion is the intuitively felt connection between the various senses communicated by a polysemous lexical item - a connection which is absent in the case of ambiguity. In my analysis of modality, I have used this argument to shed doubt on the plausibility of an ambiguity-based approach to English modals. This criterion has some prima facie appeal, which is strengthened by certain experimental results: subjects appear to produce judgements of sense relatedness with some consistency (Caramazza and Grober 1976, Colombo and Flores d' Arcais 1984,

Durkin and Manning 1989; cf. also next section). However, introspection cannot give a reliable window onto either mental representation of word meaning or the way the entries in the mental lexicon are accessed during utterance comprehension. Moreover, similarity being such a vague notion, it is unclear what these intuitions precisely tap; it may well be a post-access stage of lexical comprehension, during which speakers assess meaning similarities on the basis of world knowledge rather than purely linguistic/semantic factors. Finally, inter-subjective agreement on sense relatedness judgements is not always univocal: Panman (1982) reports considerable variation in the responses of participants to a questionnaire-based rating of sense relatedness in polysemous examples such as *crime*, *break* and *neighbourhood* in (7)-(9) below:

(7) a. The crime had been discovered by a truck-driver.
b. He published several articles on crime.

(8) a. There was a break in the conversation.
b. There was a break in the water mains.

(9) a. There are several bookshops in the neighbourhood.
b. The neighbourhood objected to his plans.

So speakers' intuitions may be used only as preliminary evidence against an ambiguity analysis and in favour of a polysemy (or a monosemy) account.

One way of sharpening intuitions of sense relatedness is by unpacking them into more concrete statements of semantic relations and overlap. One such statement is the following: If a word A consistently communicates two meanings, A_1 and A_2 in different contexts, then A may be considered truly ambiguous if there is no overlap between A_1 and A_2 (and, a fortiori, if A cannot communicate A_1 and A_2 simultaneously in any single occurrence). This criterion has been around at least since Weinreich's (1964) distinction between *contrastive ambiguity* (plain ambiguity, in my terminology) and *complementary ambiguity* (polysemy, in my terms) and seems to work for particular examples. Recall that in chapter 2, I argued that *can* in utterances such as (10) is not ambiguous between an 'ability' and a 'potentiality' reading because the former is, in fact, subsumed by the latter:

(10) a. John can give us a little lecture on cubism before we go to this Picasso exhibition; he knows so much about modern art.

b. John can give us a little lecture on cubism before we go to this Picasso exhibition; I'm sure he won't be too busy.

Similarly, in (11a) the two meanings ('aperture' vs. 'frame') of the polysemous entry *window* are collapsed (example from Pustejovsky 1995: 48); moreover, in (11b) *see* can be interpreted as simultaneously 'perceive' and 'realise':

(11) a. John crawled through the broken window.

b. I saw that my father was still in the car.

No comparable examples can be given for genuinely ambiguous items such as *bug* ('device' vs. 'insect') or *cardinal* ('number' vs. 'priest'); the utterances in (12) are unacceptable on a 'collapsed' interpretation:

(12) a. *I find bugs very irritating and always try to remove them from my room.

b. *You have to pay attention to the cardinals: they are very important in the groups they belong to, be they priests or numbers.

More pressing arguments for keeping ambiguity separate from either polysemy or semantic indeterminacy come from standard syntactic tests. Here, I will mention only a couple by way of illustration (for more detailed discussion, see Zwicky and Sadock 1975, Lyons 1977: 405ff., Kempson 1977: 123ff., 1980, 1986, Kempson and Cormack 1981, Cruse 1986: 54ff., 1995, Atlas 1989: 25ff., Zhang 1998). The first test relies on the possibility of co-ordinating the putatively distinct senses of a word in a single structure. Co-ordination in (13) is felicitous, thereby suggesting that *see* is non-ambiguous (i.e. it is either monosemous/semantically indeterminate or polysemous):

(13) I saw that the suitcase was empty and that Jones had lied to me.

By contrast, the zeugmatic feeling of (14) is a piece of evidence that the verb *expire* is ambiguous (example from Cruse 1986: 13):

(14) *Arthur and his driving license expired last Thursday.

The second test involves the anaphoric expression *do so too*, the interpretation of which requires a same-sense antecedent. In (15), this requirement is met (example adapted from Kempson 1977: 131):

(15) Brian killed a bird today and Jonathan did so too.

In (15) it is possible that Brian shot the bird, while Jonathan accidentally ran the bird over: this shows that *kill* is not ambiguous depending on whether the action denoted by the verb is intentional or not. By contrast, *run* in the following example fails the test: (16) cannot mean that Mary participated in the race, while Susan organised it; the impossibility of a crossed reading provides evidence for treating these two senses of *run* as belonging to distinct lexical entries with distinct semantic representations:[20]

(16) Mary ran the race and Susan did so too.

A final criterion for distinguishing ambiguity from polysemy/semantic indeterminacy involves the cross-linguistic persistence of the meanings systematically conveyed by a given lexical item. This 'argument from translation' draws on the following fact: In cases of ambiguity, there is an arbitrary connection of two or more meanings with the same surface form; as a result, one would not expect cross-linguistic similarities in ambiguity patterns. This prediction seems to be borne out. For instance, it is an idiosyncratic property of the English word *ear* that it is ambiguous between two senses: 'organ of hearing' vs. 'grain-holding part of a cereal plant' (example from Taylor 1995: 103). The same grouping of meanings under a common form does not survive translation in different languages. By contrast, in both polysemy and indeterminacy

[20] My use of 'lexical entry' in this chapter conforms to standard practice and should not be confused with the relevance-theoretic notion mentioned in chapter 1.

there is some motivation behind the host of contextually manifested interpretations of a given term - viz. either a linguistically encoded relation (polysemy), or a pragmatically inferable connection (indeterminacy) between the corresponding concepts. Consequently, one might expect a certain degree of cross-linguistic agreement. Again, this conclusion is empirically vindicated: examples include the root-epistemic alternation in modal terms, the use of the terms such as *mouth* and *eye* to refer to apertures other than the facial ones (as in *the mouth of the river*, *the eye of the needle*, etc.), and so on.[21]

The above tests, when applied in conjunction, may lead to different predictions; indeed, the linguistic literature abounds with complaints about the variability of their outcomes. One reason for that is the involvement of non-linguistic parameters in constructing and interpreting isolated examples. Another is the genuine vagueness in some of the proposed criteria, such as sense similarity. Note, for instance, that for many speakers the two concepts expressed by *expire* in (13) are intuitively closely related; still, as the zeugmatic intepretation of the utterance shows, these two concepts are not part of the same lexical entry. I will have more to say about such clashes within lexical semantics in the following sections. For the moment, I conclude that, at least in principle, it is possible to draw the distinction between ambiguous and non-ambiguous cases, even though there may be disagreement over individual examples and interference of many factors in the application of diagnostic tests.

Assuming that the two phenomena are actually distinct, a number of researchers consider ambiguity as a less attractive option than polysemy for reasons of explanatory adequacy (see Gibbs 1994, Taylor 1995; for a different view, see Kempson 1977, 1980). Especially within the Cognitive Linguistics literature, there is a tendency to maximise polysemy at the expense of ambiguity, since the former, unlike the latter, is internally 'transparent': i.e. the relations between the concepts encoded by a single lexical item can be read off from the semantic entry of the item. Apart from intuitions of relatedness, richer (:polysemic) lexical entries are claimed to account in a more natural way for novel uses of existing words (or sense extensions). For instance, one might propose that *climb* is ambiguous between the senses exemplified in (17): when

[21] To the extent that polysemy is considered a semantic phenomenon, one expects to find some cross-linguistic differences in what is permitted in various grammatical/lexical systems. I will return to this point below.

predicated of animate beings, the verb denotes an act of ascending through laborious manipulation of the limbs, whereas otherwise it simply refers to a gradual ascent:[22]

(17) a. The girl climbed the tree.
b. The plane climbed to 30,000 feet.

However, this is to miss an important generalisation: not only are the separate senses of *climb* related (through metaphor), they can also be extended in an equally motivated way to novel uses, such as (18):

(18) a. The soundtrack of the film climbed the charts.
b. I climbed into my suit.

The suggested conclusion is that *climb* and similar terms form clusters of inter-related meanings. Some of these meanings (e.g. the meaning of *climb* in (17a)) correspond to the prototype for the category, and are felt to be more central to the cluster as a whole. This model recognises that the processes which give rise to one-off, wholly creative novel uses of words are of the same type as conceptual processes (such as metaphor or metonymy) which relate the separate senses of a polysemous lexical item. Depending on factors of frequency, distribution, etc., former creative uses may go on to become conventionalised to varying degrees and thus become part of a polysemous cluster themselves.

The assumption that polysemy, unlike ambiguity, may account for the productivity of lexical meaning is shared by various authors in the field (Pustejovsky 1995 talks in this connection of the 'generative lexicon'; cf. also Pustejovsky and Boguraev 1996, Pustejovsky and Bouillon 1996, Copestake and Briscoe 1996, Ostler and Atkins 1991, Nunberg and Zaenen 1992). However, polysemy is not in any obvious sense a better candidate to explain lexical creativity than ambiguity. As the above tests for ambiguity have shown, it is often possible for two lexical items with an intuitive connection to come out as a case of ambiguity (e.g. *run* in (16)); in such cases, one may assume that the connection functions as a piece of etymological information

[22] The polysemy-based analysis of *climb* comes from the work of Fillmore (1982).

which links two distinct lexical entries and does not participate in the synchronic, on-line comprehension of the corresponding word. Now the question arises: why can't this sort of etymological connection account for the fact that novel extensions are possible (and, indeed, pervasive) in word usage? I will explore this possibility at greater length in the next section, but for the moment I do not see what the advantages of polysemy over this construal of ambiguity are going to be.[23]

I now turn to the division of labour between monosemy (semantic indeterminacy) and polysemy, which has been a central topic throughout this thesis. In contrast to ambiguity, both of these positions have the capacity to account for the intuitive connection between the various meanings communicated by a lexical item in different contexts. Faced with competing monosemy- and polysemy-based analyses, the question arises as to what possible criteria might be used to adjudicate between them. I will start with two, rather obvious, possibilities.

Firstly, monosemy is greatly favoured by the predictability of the range of lexical meanings through independent pragmatic principles from an underlying 'core' sense. Recall that, according to the account of modality proposed in the previous chapters, the 'performative', deontic interpretations of modals are contextual developments of root interpretations rather than distinct semantic entities; for instance, the 'permission' interpretation of *can* in (19) is a pragmatic development (in the appropriate contextual conditions) of the 'potentiality' meaning which the verb grammatically encodes:

(19) You can leave the door open.

This analysis of deontic interpretations bears similarities to the relevance-theoretic analysis of mood (Wilson and Sperber 1988a and b). On the original Wilson and Sperber analysis, a variety of mood indicators may take on 'performative' overtones which are independently motivated by the principle of relevance and broad conditions on contexts. Within this framework, expressions encoding potentiality (:compatibility with factual assumptions) can be used to convey permission in a quite general way,

[23] By the same token, the generativity argument does not explain why polysemy rather than semantic indeterminacy is involved in the above examples.

depending on assumptions about status and authority among the interlocutors.[24] Another example where pragmatic/conceptual factors are responsible for systematic meaning multiplicity associated with specific linguistic constructions is the 'metalinguistic' use of modals, negation and conditionals which I have surveyed in section 3.3. The presence of an independently established pragmatic phenomenon, viz. the ability to set up and comprehend a specific type of metarepresentation, relieves the semantic component of the need to account for these meaning variations in a principled way.

Secondly, monosemy is favoured by the absence of separate grammaticalisation/lexicalisation of the candidate senses in different languages. The more likely it is for a certain process to be pragmatic/natural, the less likely it is for this process to be formally marked. This is the inverse side of the argument already put forth for distinguishing polysemy from ambiguity: true ambiguity is placed very low on the predictability scale and is expected to block translation equivalences across languages. By contrast, clear cases of univocal semantic entries which give rise to systematic, pragmatically determined interpretations maintain cross-linguistic stability. Examples are offered by the metalinguistic uses of logical operators; especially for the better-documented case of negation, it is known that metalinguistic uses are widespread but remain cross-linguistically grammatically unmarked (Horn 1985). Similarly, the pragmatically enriched versions of the *and*-conjunction in (20) do not seem to receive distinct encodings, although they are attested in a variety of languages (see Carston 1998 for discussion):

(20) a. She ran to the edge of the cliff and jumped. (and then...)

b. I insulted him and he resigned. (and as a result...)

Although the monosemy end of things is rather uncontroversial, the argument from grammaticalisation is less secure on the polysemy side. It is standardly assumed that, as far as grammaticalisation is concerned, polysemy is different from both ambiguity and monosemy: although a degree of uniformity persists across languages, there are

[24] See Rouchota (1994a) and Clark (1991) for detailed applications of the relevance-theoretic analysis of mood.

differences among separate grammatical systems concerning which dimensions of a broader conceptual space are going to be encoded. Indeed, this has been one of the main arguments in support of a polysemy-based analysis of the English modal system (Sweetser 1986). On this view, modal expressions in different languages carve up the broad conceptual space of modality in different ways; as a result, there is no straightforward equivalence between the modal systems of various languages. Moreover, given that the epistemic/root distinction is a major structural divide within this conceptual space, it is not the case that all modal expressions systematically alternate between epistemic and root interpretations. One may therefore conclude that the root/epistemic distinction in separate modal systems (or in specific lexical items within a modal system) is the output of linguistic encoding and not pragmatic processing - hence of a polysemy-, not a monosemy-based semantics.

I do not find this argument for polysemy particularly convincing. As far as the example of modality is concerned, my analysis also views it as a broad conceptual space within which commonalities as well as individual variations are expected among grammatical systems. However, it has been my contention that the root/epistemic distinction is not, in fact, inherent in the conceptual space of modality; it is rather the product of very general pragmatic processes which draw on our capacity to metarepresent. These capacities interact with the specific constraints placed on the modal system by particular grammatical systems, so that individual systems (or modal expressions) may differ along a number of parameters. None of this prevents a given modal item from being semantically univocal, although different from superficially similar modal expressions in other languages.

One may object that a purely pragmatic account of systematic meaning multiplicities runs the risk of overgeneration. To revert to modality, not all English modal verbs which have root interpretations also admit epistemic readings - *can* being the obvious counterexample. However, such non-occurrences can be predicted even within a radical pragmatic account in a number of ways. One solution is through blocking by semantic constraints: I have argued above that the type of admissible restrictor for *can* precludes the possibility of epistemic interpretations. Another option

is pre-emption by existing members of the grammatical/lexical system.[25] For instance, one may argue that the animal/meat alternation in pairs such as (21) is a pragmatic (rather than a semantic) phenomenon, i.e. it is a case of inferential derivation rather than polysemy. One may then predict restrictions on the alternation in examples such as (22a) on the basis of already available lexicalised options such as (22b):

(21) a. I saw a rabbit in the garden.
b. We had rabbit with onion sauce for dinner.

(22) a. *Sheep with potatoes is a traditional Greek roast.
b. Lamb with potatoes is a traditional Greek roast.

If this is right, it follows that the argument from translation is less than absolute: it is perfectly possible to have univocal lexical items in a certain language which lack exact translational equivalents in other languages. Monosemy does not guarantee universality, because it is shaped by what is grammatically possible in different linguistic systems. Seen in this light, modality does not present a puzzle: modal expressions obey specific grammatical constraints and hence their lexical meanings are expected to cross-linguistically overlap only partly (if at all) in terms of the modal relations and modal restrictors they encode. But if we cannot expect monosemy to coincide with universality/translatability, we cannot use the latter as a criterion to distinguish monosemy/semantic indeterminacy from polysemy.[26]

Are there any other ways of distinguishing between these two options? Given competing analyses, a large number of authors consider polysemy-based semantics as preferable to monosemy (and ambiguity) alternatives for several reasons. Some involve diachronic and developmental arguments; I will leave these for a later stage in the discussion. In the remainder of this section, I will concentrate on some synchronically relevant facts which have been presented as obstacles to monosemy analyses, and hence as reasons to opt for polysemy-based semantics (Taylor 1995, Sweetser 1986,

[25] In fact, pre-emption may also be invoked in the case of *can*: *may* can already express epistemic possibility in the English modal verb system.

[26] Part of the problem stems, I think, from the notion of 'abstract meaning' which lies at the heart of most monosemy approaches. Conjunction and negation seem inherently 'abstract', and thus good candidates for monosemy (see Sweetser 1986); by contrast, modal expressions often have much more 'specific' senses which do not extend straightforwardly from one language to another. However, this only apparently denies the possibility of more specific, and yet univocal, semantic entries.

Gibbs 1994, Rice 1992; for a different position, see Ruhl 1989, Bierwisch and Schreuder 1992).

Firstly, it is often noted that abstract meanings for items which exhibit a rich array of superficial meanings are generally hard to state. For instance, Taylor (1995) in his discussion of *climb*, notes that the central sense of the verb (exemplified in (17a) above) can be paraphrased as 'locomotion from a lower to a higher level by means of a fairly laborious manipulation of the limbs' (ibid. p.106). However, this paraphrase cannot be extended to capture the rest of the meanings communicated by the verb. Even if one drops all the specific attributes of the core meaning and assumes that *climb* semantically encodes 'ascend', the paraphrase 'scarcely does justice to the complexity and subtlety of the individual senses'; moreover, it fails to 'provide any adequate basis for distinguishing *climb* from other verbs which also profile the upward movement of an entity, such as *ascend*, *rise*, *go up*, etc.' (ibid. p.107).

Here, as elsewhere, a monosemy position is seen as involving some sort of decompositionalism. There is a requirement on the 'core' meaning of a lexical item not simply to be effable in natural language but also to possess a sufficiently high degree of effability (so as to surface in paraphrase). This conception of the 'core' lexical meaning is thus reminiscent of the classical model of categories, which attached to the great majority of natural-language words a set of individually necessary and jointly sufficient conditions for category membership (i.e. a definition). As I have mentioned earlier in this chapter, the decompositionalist program broke down because of insoluble empirical and theoretical problems, not the least of which was the impossibility of formulating satisfactory definitions for most natural-language items. If the semantic entry for indeterminate lexical concepts is assumed to be a different concept, which somehow constitutes the 'core' or basis for the contextual development of a range of lexical interpretations, then for many concepts this project will reiterate the difficulties of semantic decomposition.

It is not the case, however, that semantic indeterminacy requires semantic decomposition. In certain instances, it may be possible to be precise about the concept encoded by a lexical item which exhibits a variety of contextual interpretations: in the case of the *and*-conjunction or the negation, there is a logical vocabulary which

furnishes candidates for underlying senses.[27] In other instances, univocal semantic entries are not paraphrasable without loss or distortion of meaning. This is not an evasion on the part of the theory: even if it is not possible to specify all the conceptual attributes for a certain lexical concept, it is certainly feasible to isolate the dimensions along which the concept is indeterminate. For instance, it is easy for speakers of English to identify the aspects of the meaning of *fast* which are unspecified by its semantic content but will be filled in through contextual modulation of its meaning:

(23) a. John's car is fast.
b. She is a fast typist.
c. Avoid fast movements.

A second argument against monosemy and in support of polysemy comes from speakers' ability to assign degrees of relatedness to surface interpretations of lexical items in non-symmetrical ways. Consider the example of *line*, which can contextually communicate a range of meanings. Caramazza and Grober (1976) classified these meanings into clusters according to the intuitions of subjects in a number of experiments they conducted. Below I give the central (:most frequent and typical) sense of *line* in (24) and two of the clusters in (25) and (26):

(24) a. We were told to line up.
b. The shortest distance between two points is a straight line.
(25) a. Ford is coming out with a new line of hard tops.
b. He had come from a line of wealthy noblemen.
(26) a. When the curtain rose for the second act, Bob could not recall his opening line.
b. She said it was a line from Keats.

Informally, *line* in (25) denotes a sequence/ordering of constructs, while in (26) it denotes a continuous sequence of words. On a polysemy-based analysis, these might be

[27] In my analysis of modality, the proposed semantics for modals is not meant to represent a decomposition of modal meanings; it is rather intended to clarify the way contextual assumptions can interact with the univocal (unanalysable) semantic content of the modal verbs.

considered independent (although connected) senses of the word; a monosemy-based analysis, by contrast, would take *line* to be univocal but drawing on distinct contextual assumptions in each example. A potential problem for a univocal semantic analysis is to explain the relative distance between the various contextually-determined meanings in a way that respects the above clusters.[28]

Again I do not think this argument presents a serious challenge to the monosemy view. One way of accounting for the cluster effects is to consider them a product of pragmatic processing, brought about by the relative accessibility of intermediate contextual assumptions which are necessary for the derivation of contextual readings. For instance, both the utterances in (26) require the activation of encyclopedic assumptions about theatre plays or poetry, the form of their written versions, etc.; the geometrical concept of *line* given in (24) can thus be used loosely to refer to a unit of written discourse.[29] The situation is different in (25). In (25a), for example, the linguistic content of the utterances activates assumptions about the way cars are produced, the way identical models come out of the factory in a (geometrical) line, etc.; this context licenses a rather different interpretation of *line* from the one in (26). So although pragmatic derivation rather than semantic decoding is responsible for the derivation of the different readings of *line* in (25) and (26), we can still predict differences in the way these readings are interrelated.[30]

In the same connection, it is sometimes observed that creative sense extensions normally apply to a more specific sense of a word (i.e. to a part of a polysemy cluster) rather than to a broad, underlying meaning. To take the example of *line* again: it may be claimed that the metaphorical use of (27) is derived from the more specific sense in (25) - rather than the abstract, geometrical sense of *line* - since in both cases the noun denotes a series/succession of constructs; this would conform to the cluster organisation of surface meanings in the experimental setting, in which examples such as (25) and (27) were grouped closer to each other than to either (24) or (26):

[28] This is not a problem according to Caramazza and Grober (1976); but see Taylor (1995: 285).
[29] On the loose use of concepts, see Sperber and Wilson (1985/6, 1986/1995), and chapter 1.
[30] Closeness to the prototype for the category is also responsible for the clustering of interpretations of *line*. However, this is not incompatible with monosemy accounts: one can assume a unitary semantics for *line* and accommodate typicality effects as produced by the organisation of the encyclopedic entry of the concept. One prediction that does *not* follow from the monosemy account (although it is entailed by some approaches to polysemy) is that the 'basic' or 'core' meaning of a term will also be invariably perceived as the prototypical one; this is a good thing, as section 5.2.2 will show.

(27) We came to different conclusions using the same line of reasoning.

This type of argument does not unequivocally point towards polysemy; as before, the relatedness of different interpretations can be explained as a result of the stage-like activation of different encyclopedic assumptions in the construction of a pragmatic interpretation. The intuitions of relatedness will come out as a post-access statement of the similarity between different contextual interpretations of a single lexical entry (where similarity is defined in terms of shared logical and contextual implications).[31]

A final point used to support a polysemy over a monosemy analysis is the fact that one of the meanings systematically communicated by a lexical item may be concrete, and hence more 'basic'. This way of formulating the argument begs the question, since it presupposes a commitment to the Conceptual Embodiment thesis. Furthermore, it is not clear what the abstract/concrete distinction buys in explanatory terms: in the example of *line*, is the 'geometrical figure' interpretation (which speakers judged to be basic/prototypical) more 'concrete' than the interpretations required for examples (25) or (26)? If not, is this a counterexample to the theory? Finally, how does *line* differ from predicates such as *exist*, which may felicitously apply to different items without a change in meaning? In (28), slightly different concepts for *exist* are retrieved for each utterance; this, however, can be attributed to the (appropriate) difference between God and grizzly bears, not to two separate senses of the verb *exist*:

(28) a. God exists.

b. Grizzly bears exist.

The point is that, depending on the sort of things which form a (geometrically defined) line, the concept retrieved for the comprehension of *line* is slightly different: lines of

[31] Similarly, it is argued that the existence of a synchronically productive system of related metaphors lends support to the presence of a polysemy cluster rather than an indeterminate univocal semantic entry. In proposing a force-dynamic account of the English modals, Sweetser (1986, 1990) notes the presence of figurative uses such as (i) and (ii) which, in her view, support the metaphor story:

(i) I am forced to conclude that...

(ii) I am not barred from concluding that...

The existence of independently motivated metaphorical mappings, however, may be used to motivate one polysemy analysis over another; I do not think it can lend support to a polysemy over a monosemy account. This is even more so in modality, where the parallel between epistemic modals and (i)-(ii) is not immediately obvious.

trees, lines of argument and lines of car all differ along this dimension. We do need a (pragmatic) theory about how this contextual modulation of the concept encoded by *line* takes place (and I will make some suggestions in section 5.2.3 below); but I don't think we need a semantic theory (involving polysemy) for all the different concepts of line we can construe and communicate.

Let me summarise the argument so far. I have outlined certain criteria which are meant to separate polysemy from either ambiguity or semantic indeterminacy. The results suggest that, although in principle the three phenomena are distinct, in practice it is difficult to decide where individual cases of lexical items belong. Furthermore, a range of considerations which have been assumed to favour polysemy-based analyses over the other two options have been shown to be inconclusive. Consequently, although there are some genuine cases of systematic meaning multiplicity which are not captured by either ambiguity or monosemy accounts, this class may be much smaller than the range of phenomena which have been subsumed under polysemy in linguistic analyses. In other words, the scope of polysemy in linguistic semantics is more constrained than has previously been assumed.

What I want to do next is further motivate the claim that much of the workload of so-called polysemy can be re-allocated to either ambiguity or semantic indeterminacy; I will also illustrate some of what I consider genuine cases of polysemy and the generalisations they lead to.

5.2.2 Processing polysemy

One of the central tasks of a theory of polysemy is to give a psychologically tractable account of how a polysemic complex is actually represented, accessed and processed during on-line comprehension. In fact, the very definition of polysemy crucially depends on the form of the underlying lexical representation of a polysemous item: in order for polysemy to be recognised as a separate phenomenon, its underlying representation has to differ in significant respects from that of both monosemous and ambiguous items. For instance, the representation of a monosemous term such as *thermostat* is supposed to open up a unitary address in one's mental lexicon:

(29) *thermostat* -> THERMOSTAT

By contrast, ambiguous items such as *bank* and *port* correspond to more than one lexical entry in the mental lexicon:

(30) *bank* -> BANK-1 ('financial institution')
bank -> BANK-2 ('river edge')
(31) *port* -> PORT-1 ('wine')
port -> PORT-2 ('harbour')

In the second case, speakers may possess etymological information to the effect that both lexical addresses can originally be traced to a single lexical source; however, this information has the form of a redundancy rule and does not participate in the synchronic computation of the meaning of *port.* The question which arises now is: how is the mental representation of polysemy to differ from the possibilities in both (29) and (30)-(31)?

Different versions of current theorising about polysemy tacitly rely on different assumptions about the storage and subsequent processing of polysemous items. I will focus on cases where the range of different meanings of a given lexical item can be traced back to a single, more abstract schematic meaning: English modals fall into this category. On the most neutral interpretation of Sweetser's (1990) claims about polysemy, the representation of, say, *must* looks roughly like this:

(32) *must* -> FORCE-DYNAMIC COMPULSION - MUST-1 (root)
-> (metaphor) - MUST-2 (epistemic)

An overarching image-schematic concept, the force-dynamic concept of compulsion, organises the polysemic entry for *must*: when applied to the domain of physical experience, the result is a root modal meaning; when the image-schema projects into the abstract domain of reasoning, the epistemic meaning of *must* is produced. The priority of the root over the epistemic meaning is captured by the explicit

representation of the metaphoric motivation of the sense extension into the epistemic domain.

I will call representations such as (32) *cluster models* (cf. Langacker's 1988 'network models'). Cluster models allow for - although they do not require - the presence of an overarching general meaning. Where such a meaning exists, as in (32), the specific senses listed in the entry are instantiations of the blueprint, linked to each other through relations of similarity. Speakers of the language, the claim is, are sensitive to such relations and have complex intuitions about how the various sub-entries in polysemous items are synchronically related (Gibbs 1994, Lakoff 1987a, Taylor 1995). Cluster models capture the difference between polysemy and either monosemy or ambiguity: polysemy, unlike ambiguity, is a property of unitary lexical entries; polysemic lexical entries, unlike monosemic ones, internally branch off to multiple interconnected sub-entries. In this respect, the representation in (32) occupies a middle ground between those in (29) and (30)-(31).

There are at least three ways of construing cluster models from the point of view of lexical comprehension. A first possibility is to take the various senses of a polysemous lexical item (i.e. the nodes of the cluster) to be individually memorised; their conceptual relation will then be represented as a redundancy rule connecting two (or more) individual sub-entries within a single lexical address. During utterance comprehension, the nodes will be jointly activated and processed, while their conceptual links will be secondarily available as sources of intuitions about the relatedness of the separate senses. This option, which may be called the 'nodes only' approach, is compatible with a lot of writings on polysemy; however, it faces a number of problems. Firstly, if the synchronically-felt connection among the sub-parts of a single lexical entry is not recovered during utterance comprehension, then there is in practice very little to differentiate polysemy from ambiguity. Notice that, apart from cases like *bank*, where no connection is felt between the two meanings conveyed by the same form, there are ambiguous words such as *port* above for which some sort of connection exists and is recoverable by speakers of the language: the 'nodes only' account of polysemy will conflate this type of ambiguity with classical cases of polysemy. This may not be objectionable in itself; nevertheless, it is a conclusion hard to reconcile with the wish to separate ambiguity from polysemy on principled grounds.

The second problem for the 'nodes only' solution relates to the first: if polysemy simply consists in the attachment of a redundancy rule (or a set of redundancy rules) to an internally complex lexical entry, then it is not a particularly interesting aspect of lexical semantics. Etymological links can be viewed as yet another type of lexical relation such as synonymy, hyponymy and so on, which operates throughout the mental lexicon. These relations do not play a role in on-line lexical understanding but may be used in post-access inference. Seen in this light, redundancy rules, although 'part of the semantics of the language' (cf. Sweetser 1990, on the English modals), are not synchronically relevant for the mental representation of word meanings.

Finally, this view entails that the senses of a polysemous item are distinct, enumerable and mutually exclusive: this is most certainly not the case in the majority of examples. In the case of modality, as Coates (1983) has shown, it is difficult to separate all the possible interpretations of a modal verb; more generally, the literature abounds with examples of words for which it is difficult to determine whether they are truly polysemous, or whether the variety of meanings they systematically convey can be reduced to a 'core' meaning plus some contextual conditions for various interpretations (Ruhl 1989).

A second option for psychological accounts of polysemy is to consider that the polysemy cluster is accessed exhaustively. On the 'full access' account, both the hyper-sense and the lower nodes are activated and processed during on-line comprehension. As a result of pragmatic processes of understanding, all nodes will be suppressed apart from the intended sense, together with its relation to the hyper-sense. Unlike the previous solution, the 'full access' proposal is capable of distinguishing polysemy from ambiguity on principled grounds, for the semantic relation among the senses of a polysemous item participates in utterance comprehension, unlike what happens in ambiguity processing. However, certain questions remain. To begin with, it is hard to motivate such a solution in terms of cognitive economy: why should the cognitive mechanism go through the computation of the various meanings in a polysemic network if the results are already streamlined (and accessible)? If no computation is involved and the conceptual relation motivating polysemy is simply added on top of the lower nodes, we are back to redundancy rules and their problems. Moreover, both the 'nodes only' and the 'full access' positions, by appealing to post-access suppression

mechanisms, make the following prediction: the more polysemous a word is (i.e. the larger the underlying network of senses), the greater the extent of sense suppression required, hence the longer it should take to process. Experimental response times in verification tasks show that this prediction is not borne out (Grober 1976, Caramazza and Grober 1978).

There is a prima facie more plausible variant of the 'full access' approach (which seems to be implicit in Sweetser's (1990) discussion and other works on polysemy): understanding polysemy does not involve simply retrieval but on-line derivation of the intended meaning. On this view, what is accessed is simply the superordinate sense (image-schema, etc.) and the mappings which will instantiate the more specific meanings of a polysemous item. Depending on contextual considerations, certain mappings will be suppressed and the correct one retained. In order to preserve the assumption that some meanings are more basic than others within the cluster, this model has to accommodate some hierarchy of mappings; in the example of *must* in (32), this postulates a directionality from the root to the epistemic meaning, so that the latter cannot be accessed without the former. I will call this the 'hierarchical access' position.

The dependency of some meanings on others within a polysemy cluster is also reflected in the psycholinguistic literature, which often recognises degrees of dominance (or centrality) among the senses of a polysemous word. Durkin and Manning (1989) conducted a study in which subjects were asked to detect similarities between the meaning of a polysemous word embedded in an utterance, and a target word which was primed by either the dominant meaning or a non-dominant meaning of the polysemous word. Given a word like *fortune*, they established prior to the experiment that the word communicates two meanings which are judged as highly related. On the basis of production frequency, they rated the sense 'wealth' to be dominant and the sense 'good luck' to be non-dominant. They then asked subjects to detect similarities between each of the occurrences of *fortune* in (33) on the one hand, and each of the two targets, *wealth* and *luck,* on the other:

(33) a. I won a fortune on Lotto.

b. I tested my fortune on Lotto.

They found that dominant meanings ('wealth') were more likely to be correlated with utterances biased towards the non-dominant meaning such as (33b) than vice-versa.

More interestingly, Williams (1992) employed a lexical decision task (familiar from psycholinguistic studies of ambiguity) for polysemous words using similar material. One of his examples was *dirty*, which can be interpreted as 'soiled' (dominant meaning) or 'obscene' (non-dominant meaning); he embedded the word in sentences priming one or the other interpretation and tested word recognition for the targets *soiled* and *obscene* in both types of sentences:

(34) a. The comedian was banned from television because his jokes were so dirty.

b. After playing football his legs were very dirty.

He found that recognition of targets related to dominant meanings in unrelated environments (e.g. *soiled* presented after (34a)) was primed regardless of delays, and that the priming did not diminish over time; however, priming of targets related to the non-dominant meanings in unrelated environments (e.g. *obscene* presented after (34b)) was weaker and tended to diminish over time. Moreover, these effects were associated with utterance comprehension, since isolated prime-target pairs (e.g. *dirty-soiled* vs. *dirty-obscene*) did not show any degree of differential facilitation. It would seem, therefore, that, quite apart from introspection, on-line processing data support the conclusion that some senses of polysemous items are privileged, or that a certain directionality exists in the way the various senses are produced from an over-arching blueprint.[32]

I think that some version of the 'hierarchical access' model has to be correct. That is, in order for a lexical item to qualify as polysemous rather than ambiguous, it must be that its non-central meanings are derived on-line from the central sense(s) through a specified process; furthermore, in order for polysemy to differ from semantic

[32] A further, rarely considered possibility is that clusters are accessed differentially. This idea (which one might call the 'variable access' solution) is consistent with the network-like organisation of polysemy, but allows different parts of the entry to be accessed according to the demands of communication. Taylor (1995) puts forth this view in order to account for the variable acceptability of zeugmatic constructions with polysemous words. It is not clear what sort of constraints the 'variable access' position needs in order to determine which aspect of the cluster the interpretation process will focus on; I will not consider this option in what follows.

indeterminacy, this process must be more constrained than fully inferential pragmatic work. So we have a way of making certain cases of polysemy intelligible, without reducing them to either ambiguity or monosemy. However, once we try to pursue this option within many current cognitive models of polysemy, we have to rely on machinery which is not always free of problems, as I have argued earlier in this chapter. For instance, assuming that polysemy involves image-schematic mappings between or within conceptual domains, we have to answer questions about how these mappings are fleshed out, or how domains are individuated.

Moreover, in order to cash out the psycholinguistic findings about polysemy, one has to show that the (rather crude) psycholinguistic notion of dominance can be correlated with semantic basicness/centrality as recognised by theoretical analyses. In the remainder of this section, I want to argue that dominance in experimental work generally coincides with typicality, but the ascription of typicality values to the different senses of an (arguably) polysemous lexical item does not necessarily obey basicness ratings among the meanings of the item.

I'll use Lakoff's writings to illustrate. Recall that, on his view, word meanings are represented in terms of Idealised Cognitive Models (or parts thereof), and each kind of ICM can give rise to a different kind of typicality effect. To avoid the 'effects = structure' fallacy (Lakoff 1987b), Lakoff does not generally take prototype effects to be directly 'read off' from ICMs; nevertheless, with regard to lexical polysemy, he holds that typicality judgements are actually attached to particular *senses* of a given lexical item, and can thus be predicted given the basicness of one sense over the rest. Consider Fillmore's example of the adjective *long*, which has both a spatial and a temporal reading: according to Lakoff (1987a: 416-7), 'the spatial sense is generally taken to be more central, *or prototypical*, and the temporal sense is related to it via metaphor' (my emphasis). Thus, typicality judgements, at least in this case, recapitulate the (synchronically felt) dependency relation of the temporal upon the spatial sense. Similar comments have been made in the case of modals: root senses are taken by Cognitive Linguists to be more typical than epistemic, since they are derivationally more basic or prior.[33]

[33] It is worth observing here that it is another tenet of the theory, Cognitive Penetrability, which makes possible the supervenience of prototypicality on relations between word senses (see also Taylor 1995, Geeraerts 1993).

Here is the problem: if the directionality of metaphorical and other mappings within the lexicon accurately mirrors typicality ratings, then the following must be true:

a) there is bound to be little disagreement among speakers as to the typicality of the senses of a polysemous word: which sense is basic (and, hence, prototypical) is determined by the usual constraints imposed by Conceptual Embodiment, environmental input, etc., and should thus be the same across individuals in a given community; similarly, there should be little disagreement within an individual as to which sense is to instantiate the prototype for the use of the word;

b) in accordance with the general priority of concrete over abstract senses in polysemous words (cf. the Conceptual Embodiment thesis), the former will invariably be perceived as more typical than the latter.

It turns out that both of these predictions are erroneous. First, there is no obvious reason why this particular class of typicality judgements should prove to be immune from the discrepancies usually observed in prototype formation and evaluation across individuals, cultures, times and contexts. More importantly, there is some empirical evidence that in practice disagreements do exist. Durkin and Manning (1989) report that judgements of subjects as to the 'dominance' (:basicness) of one sense of a polysemous item over another were largely a product of the sentence context; in the absence of a biasing context, 'the dominant meaning of a polysemous word is taken to be that which comes more readily to mind' (ibid. p.589). In an already familiar study, Caramazza and Grober (1976) asked subjects to produce typicality judgements for various 'senses' of the word *line*, as these appeared in several sentences. They found that the highest typicality ratings were awarded to senses for which it had been established (independently of the experiment) that they had the highest frequency ratings. Both accessibility and frequency effects of the type demonstrated in the two experiments are generally assumed to have a bearing on the construction of prototypes (Barsalou 1992); in particular, they have been used to explain the variation in typicality judgements across subjects, times and situations. However, these effects are not compatible with the position that subjects' typicality ratings were based on the derivational (semantic) priority of one lexical meaning of a polysemous word over others. Semantic basicness is presumably fixed (cf. the *long* example), while typicality judgements vary.

Second, there are examples of polysemous words where typicality judgements do not actually reflect 'basicness' judgements. Consider the word *model*: for the sake of argument, I assume that it is polysemous and that its senses may roughly be paraphrased as follows: (i) 'reproduction/representation of something', (ii) 'example to imitate', (iii) 'person who poses for artists', (iv) 'mannequin' (I simplify for exposition). A Cognitive Linguistic analysis would in all likelihood assume that the first listed sense is the basic one, from which the other senses are derived via metaphoric and other processes (this would conform with the historical facts, so that polysemy recaptures internal semantic reconstruction - Traugott 1986). However, I strongly doubt that this 'basic' sense would fare very well on the typicality ratings; in fact, a preliminary investigation with native speakers shows that (ii) and (iv) are more plausible candidates. Obviously, a lot more needs to be said about this example; if generalised, however, similar cases may provide counterexamples to the connection between prototypes and semantic basicness.

The above discussion has suggested that, despite the confusing assumptions surrounding this notion, there is a way of making polysemy consistent and psycholinguistically intelligible; as a result, however, the scope of this phenomenon is greatly reduced. In the next section, I want to make some suggestions as to how both apparent and genuine cases of polysemy may be handled within a more inclusive picture of the psychology of word meaning.

5.2.3 The psychology of word meaning

So far, I have claimed that a number of factors which have been assumed to require a polysemy analysis for a large class of lexical items can, in fact, be accommodated by either ambiguity or semantic indeterminacy of some sort. This opens up the way to a reanalysis of many individual cases. To take one well-known example, *open* appears to be able to convey a large number of interconnected meanings in different contexts:

(35) a. Open the office/a parcel/an envelope.

b. Open the door/the lid/the cork.

c. Open one's shirt/a zip/a penknife.

d. Open an exhibition/a nature reserve/a road.

e. Open a discussion/a debate/a conference.

On a polysemy analysis, *open* encodes a cluster of concepts which correspond to the separate meanings in (35a-e) and which are brought together by criss-crossing levels of similarities: (35a) involves the idea of gaining access to the interior of a closed container; (35b) focuses on the manner a device may be manipulated so as to create an aperture; the use in (35c) focuses on the moving apart of the component parts of an entity; (35d) has to do with making something accessible to the general public; finally, (35e) refers to the initiation of an interactional process (Taylor 1995: 287).

Notice firstly that not all of the above meanings would pass the classic ambiguity tests. In particular, there seems to be a distance between (a)-(c) on the one hand and (d)-(e) on the other, so that the utterances in (36) feel increasingly zeugmatic:

(36) a. (?)I asked him to open the door and a parcel.
b. (?)I asked him to open the lid and a bottle of wine.
c. ??I asked him to open the envelope and the exhibition.
d. *I asked him to open the invitation and the debate.

On the basis of similar results, one may propose that *open* is not a unitary lexical entry but is ambiguous and corresponds to two lexical items: *open-1* might include the meanings in (a)-(c) and *open-2* those in (d)-(e). Within each of these items, *open* can be thought to be univocal: depending on the sort of thing one applies the predicate to (typically the object of the verb), *open* communicates a slightly different concept. Following Sperber and Wilson (1986/1995, 1997), I assume that the precise concept conveyed by this expression will be shaped by considerations of relevance. It is reasonable to suppose that (35c)/(35d) were previously creative, pragmatically derived interpretations of *open-1*; after intermediate degrees of lexicalisation, they formed a stable and independent lexical entry. Although the etymological connection (and hence the conceptual relation) with the parent concept are synchronically retrievable, they play no role during utterance comprehension.

The case of *good* is not dissimilar:[34]

[34] For a polysemy analysis of *good*, see Pustejovsky (1995).

(37) a. good weather
b. a good book
c. a good student
d. good food

The difference from *open* (ambiguity aside) is that *good* is semantically incomplete: being a relational adjective, it requires contextual specification of an unset parameter in its lexical meaning (corresponding to the measure of goodness). So far I have used 'semantic indeterminacy' to cover both generality of meaning (the *open-1* case) and semantic incompleteness (the *good* case): my main aim was to show how either version of indeterminacy could deal with apparent cases of polysemy (for the distinction, cf. chapter 1). Recall that a similar situation arose with modality: in chapter 2, I motivated two alternatives to polysemy analyses of the English modals, one involving contextual enrichment for semantically complete entries (i.e. entries with no 'gaps' in their semantic representation: e.g. *can*), the second involving contextual saturation for semantically incomplete entries (i.e. entries with a slot in their semantic representation, which needs to be pragmatically filled in: e.g. *must*).

As the previous examples already demonstrate, the main bulk of the reanalysis of polysemy falls on the side of pragmatics. This shift in perspective has the advantage of avoiding the proliferation of word senses which led to intricate usage-based models with few internal constraints; for instance, according to the rationale of the polysemy analysis of *open-1*, the discovery of new ways of opening things would bring about a change in the meaning of *open* (a local reorganisation of the polysemy cluster it encodes). The reliance on semantics to provide stored representations of a large number of contextually attested interpretations goes a considerable way back towards the code model of communication.[35] On this model, communication is simply a matter of successfully encoding and decoding messages into and from appropriate signals; inference plays a minimal role, and where it appears, it works in a restricted way circumscribed by code-like instructions. Many current models adopting a 'semantic maximalism' (polysemy models included), although very different in persuasion from

[35] See the discussion in Sperber and Wilson (1997), Wilson (1998).

code models in other respects, share with them a distrust of purely inference-driven accounts of the context-dependence of lexical items.

Far from being arbitrary and unconstrained, however, a full-fledged inferential model of how lexical meaning is constructed in context is, in fact, supported by much recent research on concept manipulation in communication. Works such as Barsalou (1982, 1987), Braisby and Franks (1990), Franks (1995), Goshke and Koppelberg (1992), Butler (1995) demonstrate from alternative perspectives the ubiquity of the ad hoc formation of concepts from underlying representations in various contextual conditions. From a relevance-theoretic perspective, it is to be expected that we have many more concepts than natural language words, and hence that we rely on powerful inferential mechanisms to derive a pragmatic instantiation of what may be a rather different semantically encoded content. On this account, natural-language words are simply pointers to the concept which the speaker intends to communicate in a given situation: cost-effect processing considerations, the hearer's expectations and the evaluation of the speaker's intentions all enter into the computation of the concept which is expressed (though not necessarily encoded) by a given linguistic item.

Certain aspects of this inferential process may become stabilised after repeated access; various types of typicality effects may be explained in this model as by-products of the frequency and accessibility of certain conceptual attributes over others within a single conceptual address. Neither does a pragmatic account preclude the possibility that some word uses are stored as pre-formed units and accessed from memory rather than being constructed *ab ovo*: a case in point might be the previous example *line of reasoning*, for which it is reasonable to assume that it has become a separately encoded construction. The disagreement between a fully inferential and a usage-based model rests on the proportion of concepts for which separate storage and activation is recognised.

Monosemy-based accounts of word meaning can also accommodate differences among speakers in the way lexical concepts are stored and understood. What may be an ambiguous term for one speaker may be understood fully pragmatically by another; what may be a stable, lexicalised concept for one member of the linguistic community may be a creatively produced and/or comprehended concept for another. Frequency and accessibility of use and the size and accessibility of context which prompts a

certain interpretation influence the extent and ease of lexicalisation of what were previously one-off uses of lexically encoded concepts.

I have argued at length for a complex interplay between semantic and pragmatic factors in determining what is expressed by a lexical item in a specific situation of utterance; moreover, I have claimed that the notion of polysemy has a more restricted role to play in this process than is usually assumed.[36] Nevertheless, both in syntactic tests and in experimental results on on-line processing there has been an indication that there are certain phenomena which cannot properly be reanalysed as aspects of either pragmatic manipulation or ambiguity. I now want to turn briefly to this residue of cases, which exhibit systematic meaning alternations and qualify for genuine polysemy. Consider the following examples:

(38) book copy/content

a. This book is really heavy.

b. This book is really difficult.

(39) container/content

a. The glass broke.

b. She's had three glasses in an hour.

(40) newspaper copy/institution

a. Did you read the newspaper today?

b. John works for a big newspaper.

These and other pairs have had some notoriety in recent writings on lexical semantics. It appears that they correspond to generally productive alternations within the lexicon, although some of their outputs are lexicalised to a greater extent than others and productivity is overall curtailed by pragmatic considerations and encyclopedic knowledge. These examples would pass syntactic tests as in (41), which suggests that they cannot properly be relegated to the case of ambiguity:

[36] Fodor (1998) and Fodor and Lepore (1997) also argue against polysemy analyses for different reasons.

(41) The *Press*, which is owned by one of the biggest conglomerates in the country, usually has only local news.

On the other hand, the relative predictability of these shifts cannot be captured by a fully creative pragmatic account. One way of handling these alternations is to consider them as semi-automated pragmatic routines which take as input one member of the pair and give as output the other member. Although in principle their input ranges over whatever satisfies their structural description, in practice the acceptability of particular outputs depends on pragmatic factors. As a result, different cultures/communities sanction different routines. For instance, in Modern Greek it is possible to use the name of a part of the body to denote an illness which affects that part. In English, however, *Jane has a/her heart* cannot mean that Jane suffers from heart problems. Such non-linguistic conventions/regularities have a local application and are subject to constraints such as blocking or pre-emption from already lexicalised cases (see example (22) above).

Even within this more constrained range of application, though, polysemy is not a unified phenomenon. Rather than treating all systematic alternations of the above type as pragmatic licences, for at least some cases one needs a stronger, semantic treatment. There are kinds of meaning multiplicity which, although superficially very similar to (38)-(40), are accompanied by grammatical (phonological, morphological or syntactic) constraints. Examples include the use of the name of a fruit/nut to denote the tree of the fruit/nut in Spanish and Italian, which is accompanied by a change of gender (masculine for the tree; see Copestake and Briscoe 1996: 17). Similar cases are often the province of zero-derivation morphological rules. In English, there is a rule which creates denominal verbs such as *butter*, *hammer*, etc. (Clark and Clark 1979, Copestake and Briscoe 1996): although its conceptual motivation may lie with pragmatic alternations such as (38)-(40), the rule is part of the grammar of the language.[37] Since these rules result in the creation of a novel lexical item, they should not be considered as 'proper' polysemy.

[37] For further examples and discussion, see Pelletier and Schubert (1989), Levin (1993), Pustejovsky (1993, 1995), Hale and Keyser (1993), Lieber (1980).

I cannot elaborate on these examples further. The conclusion from this discussion appears to be that some genuine cases of polysemy can be recognised and placed between radical semantic and radical pragmatic phenomena. These cases involve systematic derivation rather than retrieval of lexical meaning (a prerequisite for genuine polysemy, as we saw). The derivation may range from pragmatic, though 'local'/streamlined processes or routines to grammatical rules; its further end may involve word-formation rules which share with polysemy a general conceptual motivation, although they result in different lexical items.

5.2.4 Historical and developmental perspectives

Polysemy analyses make regular reference to historical and developmental arguments to motivate a cluster-based rather than a monosemy or ambiguity account. The claim is that neither ambiguity nor 'flat' monosemy can capture regularities in diachronic and developmental meaning changes, which can be naturally represented within polysemy networks. This claim can be unpacked into two, often interconnected, assumptions. Firstly, it is held that each of these domains will provide crucial and relevant evidence for the shape of synchronic adult lexical knowledge; secondly, it is expected that the directionalities in both domains will (at least frequently) non-accidentally coincide and may also reflect the judgements of competent speakers about what they know about the meanings of the words in their language. Here, I will concentrate mostly on acquisition and bring together the conclusions I have come to in the developmental study of modal categories; to a lesser extent, I will extend my comments to the diachronic evidence.

Let me start with the first claim, i.e. the bearing of developmental arguments on adult lexical competence. At first sight, the connection is open to question. Notice that it is generally accepted that the child's lexicon falls short of an adult's; moreover, the development of specific aspects of the child's capacities is normally traced against what we know about the full-fledged linguistic capacities of adults. It would then seem peculiar to use children's competence the other way around as well, i.e. to take it as indicating something about the organisation of adult competence. Acquisitional data

cannot work both ways, as evidence about both the starting point and the endpoint of semantic competence.[38]

Inferences from development have been used extensively (even in the absence of extended empirical studies) in much current theorising about lexical polysemy. As far as I can see, this argument repeats an assumption at least as old as decompositionalist accounts of word meanings: definitional primitives equal developmental primitives, and thus the order of acquisition of word meanings can be predicted on the basis of their internal complexity (an assumption which has been famously attacked, together with the whole decompositionalist picture; see Carey 1982: 351ff.). As I have argued earlier in this chapter, precisely because of its neo-decompositionalist stance, this approach also has an affinity to empiricism - basic concepts are primarily experiential; hence, it inherits all the familiar problems of past empiricist accounts of the emergence of conceptual categories.

The second claim can best be summarised as the 'ontogeny recapitulates phylogeny' tenet. Stephany (1979/1986), among others, has explicitly put forth this view with regard to modality in maintaining that developmental progress re-iterates diachronic grammaticalisation processes. She concludes her article by stating: 'The priority of deontic, as compared to epistemic, modality in the ontogenesis as well as in the history of languages can be considered as indicating the primacy of the social, as compared to the epistemic, function of language' (ibid. p.400; cf. Foolen 1997). In attempting to narrow down the scope of polysemy analyses, one may want to question this connection, or its validity for synchronic competence.

It turns out that historical change and developmental progress do not always move on parallel paths. As the Appendix 3A has shown, the 'permission' reading of *may* appears historically later than the epistemic reading, and both are derived from an original 'ability' reading of the verb; by contrast, in child language the epistemic use of the modal lags behind its deontic use. Such examples could be multiplied. It is worth mentioning, for instance, that the set of the English modal auxiliaries historically

[38] What is more, it might be the case (as has been recently argued by Carey 1988) that what falls under some of the child's early concepts is not simply a subset of the corresponding adult conceptual entries, but may well be - at least locally - incommensurate with them; so, in fact, looking into the child's concepts to gain some insight into the adult semantic competence may be not merely a method of limited scope but a downright misleading one. This is not to deny, of course, that the developmental progression the child goes through may offer various insights not provided by either its initial or its steady states (I am indebted to Neil Smith for the last observation).

developed from a set of main verbs: this development has no parallel in acquisition.[39] Apart from the empirical counterexamples, though, there are conceptual reasons to doubt the parallelism - especially to the extent that the existence of similar steps in both domains is considered to be guaranteed by contentious premises such as the Conceptual Embodiment thesis.

The main reason for considering historical and developmental evidence as synchronically relevant is the presence in both cases of intermediate stages of lexical representations. In child development, it is claimed that these intermediate stages before the adult-like lexical entry is constructed remain stored even if the final adult entry includes a 'core' meaning. Similarly, in historical change of lexical meaning, previous linguistic states are synchronically available to the speakers and contribute to cluster representations of word meaning. So failure to erase previous lexical-semantic representations creates polysemy (see Taylor 1995: 286).

It is undeniably true that speakers of a language store a great deal of information about lexical items: etymological information and various other connections among lexical entries or sub-entries (synonyms, hyponyms, and so on) belong to this kind of information. However, as I have mentioned earlier in this chapter, this information does not (at least necessarily) participate in the lexical comprehension process but may serve as the starting point for many post-comprehension lexically-driven inferences. The re-organisation of lexical entries during ontogenetic and phylogenetic progress does leave behind all sorts of information which has somehow been made redundant or outdated by recent developments. In cases where this information is not erased (and this is certainly possible), it remains available somewhere in the lexical entry, but does not influence what is perceived as the (synchronic, adult-like) meaning of the item. Hence arguments which show the internal richness of lexical *information* do not immediately translate into arguments for the internal complexity of lexical *meaning*.[40]

The conclusion seems to be that the study of the directionality and succession of stages of lexical development cannot yield direct insight into the organisation of the adult lexicon. Rather, developmental models and accounts of adult semantic

[39] Thanks to Neil Smith for bringing this example to my attention.
[40] Mutatis mutandis, the same can be held for ambiguity analyses.

competence merely have to be compatible with each other and mutually informed: in the case-study of modality, I have tried to use the metarepresentation hypothesis as a means of ensuring that the semantics and pragmatics for modality make developmental sense. Likewise, accounts of diachronic change do not preclude the possibility that speakers keep track of meaning changes across time, even though they access and use synchronically univocal semantic entries.

5.3 CONCLUDING REMARKS

My aim in this chapter was to reconsider certain assumptions about word meaning and conceptual structure paying special attention to the notion of polysemy. I have argued that polysemy in natural language is not a natural class. More specifically, I have claimed that many of the phenomena it subsumes can be reanalysed as either monosemy or ambiguity; I have also attempted to counter a broad consensus in the literature on lexical semantics, according to which these alternative semantic options cannot capture basic facts about how word meaning is stored, understood, acquired and modified across time.

This is not to say that monosemy is the null hypothesis, or that all of our lexical concepts should have uniform (and unitary) semantic representations: on the contrary, this research suggests that both the form of underlying lexical semantic representations and the way they interact with the pragmatic device are complex and varied. Nevertheless, polysemic structures are not always a useful way of representing the flexibility and context-dependence of lexically expressed meaning. If the arguments of the previous pages are correct, polysemy is not a well-defined concept, and several ancillary assumptions accompanying polysemy analyses are not independently warranted.

Since research on polysemy has been a conscious reaction against unitary semantic proposals, one might view my position as a return to a more traditional conception of word meaning. True, an approach which preserves methodological principles of semantic parsimony may seem more conservative than a usage-based, data-driven one. But then it's not quite that: for whatever is gained on the semantic level has to be offset by the presence of a more dynamic and flexible device on the

pragmatic level, which will flesh out indeterminate semantic representations into full-fledged conceptual representations. Throughout this thesis, I have argued for the potential of relevance-driven inferential processes to successfully fulfil this role.

Chapter Six

Extensions: Modality and Generics

6.0 Introductory remarks

In this chapter, I will extend the framework proposed for modality in the main body of this thesis to cases of genericity. I want to argue that there is a close conceptual relation between modal and certain types of generic expressions, and hence that they may both receive a unified semantic and pragmatic treatment. In the course of the discussion, I will make some more general observations as to the nature of genericity and examine the interplay of semantic and pragmatic factors in the comprehension of generics.

There have been two types of phenomena traditionally classified as 'generic' in philosophy and linguistics. The first involves reference to a kind, as exemplified in (1) and (2); the subject NPs do not refer to a particular potato or group of potatoes but rather to the kind Potato itself:[1]

(1) Potatoes were introduced into Ireland by the end of the 17th century.

(2) The potato was first cultivated in South America.

The second involves propositions which do not describe specific episodes or isolated facts but instead report a regularity that summarises groups of particular episodes or facts. For instance, (3) reports some kind of general property attributed to the earth; it captures some sort of generalisation over particular events. Similarly, (4) states something not about an

[1] The examples (1)-(2) are taken from Krifka, Pelletier, Carlson, ter Meulen, Link and Chierchia (1995: 2).

individual fish but rather about a characteristic of fish in general - again a generalisation based on properties of specific members of the set:

(3) The earth turns around the sun.

(4) A fish likes water.

Following Krifka, Pelletier, Carlson, ter Meulen, Link and Chierchia (1995), I will call the subject NPs in (1) and (2) *kind-referring* (or *generic*) NPs, as opposed to *object-referring* NPs, and the predications involved in such sentences *kind predications*, in opposition to *object predications*. I will call sentences like (3) and (4) *characterising sentences* (or simply *generic sentences*); these will be opposed to *particular sentences*, which express statements about particular events, properties of particular objects, and the like. The respective predications will be classified as *characterising* (as opposed to *particular*) predications. Other common names for characterising sentences are 'habitual', 'dispositional' or 'nomic' (vs. 'episodic') sentences.

Kind-referring NPs and characterising sentences may co-occur within a single sentence, as the examples in (5) demonstrate:

(5) a. A lion roars when it smells food.

b. The lion knows its own kind.

However, the genericity of characterising sentences is a property of the whole sentence and is not linked to any specific type of NP. This is supported by the fact that any type of NP may occur in the subject position of a characterising sentence: bare plural NPs, indefinite singular NPs, quantified NPs, proper names, definite singular NPs, and bare singular NPs (mass terms) are all admissible, as (6) demonstrates:

(6) a. Gourmets eat frogs' legs.

b. A gourmet eats frogs' legs.

c. Every gourmet eats frogs' legs.

d. Marie/My fiancée eats frogs' legs.

e. Champagne doesn't go with frogs' legs.

It might seem that in (6a), (6b) and (6e) the locus of genericity is the subject as well as the predicate. This is true for (6e), since mass terms may denote kinds; however, bare plurals and especially singular indefinite NPs have very restricted kind-referring uses: they cannot co-occur happily with kind predicates such as *x be extinct, invent x*, or with dynamic verbs which accept generic NPs such as *x reach*:[2]

(7) a. The dodo is extinct.
b. *A dodo is extinct.
c. ?Dodos are extinct.
d. Champagne was invented by the French.

(8) a. The rat reached Australia in 1770. (as a generic)
b. *A rat reached Australia in 1770. (as a generic)
c. ?Rats reached Australia in 1770. (as a generic)
d. Champagne was introduced into Parisian night life quite early.

Obviously, reference to kinds and characterising sentences have something in common: in both cases we abstract away from particulars, be they members of a kind or specific events. Apart from this basic intuition, though, there is some disagreement as to how precisely the two types of genericity should be treated. According to some authors, there is some intrinsic connection between generic NPs and generic sentences, which should be captured either by reducing one to the other, or by linking both to a more general notion/device of genericity (Smith 1975, Carlson 1977b); other authors insist that there are significant linguistic differences among the two classes of phenomena and conclude that it would be better to keep them separated (Lawler 1972, Kleiber 1985, Declerck 1991, Gerstner-Link and Krifka 1993, Krifka et al. 1995). In this chapter, I will be concerned with specific issues arising from characterising sentences: I will have nothing to say on kind-referring generics and will remain neutral as to their relationship to the second type of generic constructions. My main aim will be to discuss the claim that characterising sentences contain some sort of semantic operator of genericity in their logical form and to suggest that the analysis of

[2] Examples (8a-c) belong to Gerstner-Link and Krifka (1993: 968). I exclude from the discussion the taxonomic uses of indefinite singular NPs such as *a rat* (= a kind of rat): these would be acceptable in examples such as (7) and (8).

modal phenomena I have advocated so far can shed some light on the nature of the generic operator.

My discussion proceeds as follows. In section 6.1, I critically review some previous attempts to deal with the semantics of characterising sentences. In section 6.2, I propose that the interpretation of these sentences closely follows the interpretation of utterances containing modal expressions and should therefore make use of some appropriate version of the semantic and pragmatic machinery for modality introduced in previous chapters. I go on to apply the framework developed in chapters 2 to 4 for interpreting modal expressions to the interpretation of characterising sentences. During the discussion, I raise and address various issues concerning the division of labour between semantics and pragmatics - a recurrent theme throughout this thesis.

6.1 PREVIOUS APPROACHES TO CHARACTERISING SENTENCES

6.1.1. Preliminaries

In English, as in other languages, it is possible to distinguish two main subtypes of generic sentences on the basis of the mechanisms which give rise to characterising interpretations: habitual and lexical characterising sentences. Habitual sentences are characterising sentences which can be morphologically related to corresponding episodic sentences; e.g. generic (9a) below can be correlated to the episodic (9b):

(9) a. Cats miaow.
b. A cat is miaowing.

Lexical characterising sentences lack morphologically related episodic predicates and so cannot be seen as generalising over events; rather, they appear to generalise over properties of individuals; stative predicates such as *weigh, know, cost, love,* etc., are commonly cited as lexical generics (Krifka et al. 1995: 17; cf. Chierchia's 1995 'inherent generics'):

(10) a. Matty weighs sixty kilos.

b. Havana cigars cost a fortune.

The two types of characterising sentences thus differ with respect to the trigger for the representation of genericity in the proposition expressed by the utterance: in habituals the trigger is (partly) a set of syntactic-grammatical features, in lexical generics it is the lexical properties of the predicate. For the purposes of this chapter I mostly concentrate on habitual sentences.[3]

With the above considerations in mind, we can now turn to the semantic analysis of characterising sentences. An initially plausible tendency is to treat characterising sentences in terms of universal quantification. On this view, the propositions expressed by (3) and (4) are given in (3') and (4') respectively:

(3') (For all values of t) (the earth turns around the sun at t).

(4') (For all values of x) (if x is a fish, then x likes water).

However, as a number of authors have pointed out, universal quantification is actually unsuitable to capture the meaning of generic propositions, since it may occasionally prove too weak or too strong. It appears to be too weak in view of *essential* propositions, i.e. propositions which convey that a given property is a necessary and exceptionless attribute of all members of the class to which reference is made (Lyons 1977: 195). For instance, it is true of all orchids that they are flowers. This makes the universally quantified propositions in (11) and (12) true but does not make the generic propositions in (13) and (14) true - unless some specific, law-like relationship is taken to hold between being an orchid and being a flower. More generally, it seems that (11)-(12) communicate something different from (13)-(14):

(11) All orchids are flowers.

(12) Every/each orchid is a flower.

(13) Orchids are flowers.

(14) An orchid is a flower.

[3] Even in habituals, as I will argue later on, the presence of genericity in the proposition expressed by the utterance is not a result of simple grammatical triggering but of a complex interaction of linguistic and non-linguistic factors.

So generics as a rule express a principled (non-accidental) generalisation over the members of a class of entities or events: to take another example, in (4) there is a principled relation between being a fish and having a good relation to water. Use of the universal quantifier does not distinguish between accidental and non-accidental properties (Dahl 1975, Lyons 1977: 195, Carlson 1982: 147).

When it comes to other sorts of generics, the universal quantifier is problematic for the opposite reason: it is too strong to capture the intended meaning of the generic proposition (Lawler 1972, Lyons 1977: 196). Usually what an utterance like (15) is taken to convey is that elephants normally eat grass, not that they all necessarily do so; similarly, the proposition expressed by the utterance in (16) is still felicitous (and true) if Claudia walks to school four days out of five in a week:

(15) An elephant eats grass.

(16) Claudia goes to school on foot.

So characterising sentences allow for exceptions, whereas universally quantified propositions do not. The latter should thus be rejected as a means of representing the former.

To preserve a quantificational semantic approach to characterising sentences, there have been proposals for a weakened (or 'modified' - see Clark 1973: 43) universal quantifier which would translate as *almost all*, or *the majority of/most*. Closer attention, though, reveals that such a quantifier would still fail to mark the non-contingent character of generic statements, and so would only do half the job. Moreover, as Carlson (1977b) remarked, one can find generic sentences which are considered to be true but which cannot be satisfactorily described by any ordinary quantifier. For instance, the following are accepted as true characterising sentences although less than half of all birds lay eggs (only the healthy and fertilised female ones), not more than five percent of the Anopheles mosquitos carry malaria, and the chance of a turtle having a long life is extremely small, as most turtles are eaten by predators early in life (examples from Krifka et al. 1995: 44) :

(17) A bird lays eggs.

(18) An Anopheles mosquito carries malaria.

(19) A turtle lives a long life.

A more promising line seems to be to postulate the existence of a (mostly) phonologically unrealised generic operator. This operator functions as a quantificational adverb - an adverbial operator which relates one set of conditions to another set within a tripartite structure. This proposal is reminiscent of the discussion in chapter 2 of tripartite structures of quantification. Recall that structures of the type in (20) have been proposed by a number of authors for representing sentences with conditionals or *when*-clauses (Lewis 1975, Heim 1982, Farkas 1981, Farkas and Sugioka 1983, Schubert and Pelletier 1989):

(20) Operator (Restrictor, Matrix)

Lewis's (1975) analysis of constructions containing an explicit adverb of quantification is particularly relevant here; the semantic representation in (21') is an application of the format in (20):

(21) When m and n are positive integers, the power m^n can be computed by successive multiplication.

(21') Q (m and n are positive integers; m^n can be computed by successive multiplication).

Q is a quantifier expressed in English by *always*, which relates the restrictor and the matrix. On a similar, split-level analysis of generic sentences where no explicit adverb of quantification is present, Q takes the form of GEN, the generic operator. Thus (15) will receive the schematic propositional representation in (15'):[4]

(15') GEN (x) [x is an elephant; x eats grass].

In the above example, quantification operates on occurrences of individual elephants who form members of a class: the operator GEN binds the variables in x. More generally, in characterising sentences quantification operates over temporally bound occurrences of an

[4] Caveat: in (21') Q functions as an unselective quantifier, binding any free variables in its scope. To capture a greater range of examples, we will have to assume that the quantifier indicates which variables it binds and which are to be bound existentially within the matrix. Here I will disregard this complication.

event, that is, situations, occasions, or cases.[5] To accommodate a further range of examples, we introduce the variable s, which stands for situation and is bound by the generic operator.[6] Thus (16) receives the (developed) logical form:

(16') GEN (s) [Claudia goes to school in s; Claudia goes to school on foot in s].

The above solution accounts for the fact that genericity takes sentential scope in the case of characterising sentences. It also captures the intuition that the role of genericity is similar to that of adverbs of quantification such as *always, seldom* and *often*. The adverbs which come closest to the meaning of the generic operator are *generally/in general, typically, characteristically* and *habitually*. Thus (15) and (16) turn out to be satisfactory paraphrases of (22) and (23) respectively:

(22) a. Generally, an elephant eats grass.
b. Generally, when something is an elephant, it eats grass.

(23) a. Generally/habitually, Claudia goes to school on foot.
b. Generally/habitually, when Claudia goes to school, she goes to school on foot.

Apart from its intuitive appeal, this approach manages to capture the quasi-universality of many generics: for (15) and (16) to be true, in the majority of cases to be checked (instances of elephants or Claudia's going to school), the state of affairs denoted by the matrix has to hold. If most elephants eat grass, we can felicitously (and truthfully) say that elephants generally eat grass; if only a small subset of them eats grass, the assertion is infelicitous (and untrue). On the other hand, this 'neo-quantificational approach' (Kleiber 1985) avoids the shortcomings of universal quantification. The ability of adverbs of quantification to represent the nature of genericity is further demonstrated by their semantic incompatibility with particular sentences:

[5] These notions are meant to be equivalent to the notion of *stage* introduced by Carlson (1977a).
[6] One might wonder where the situation argument s comes from. Kratzer (1995) has suggested that episodic verbs have, in addition to their usual syntactic arguments, an argument for the location of the event described by the verb. This argument can be bound by quantificational adverbs (see also Krifka et al. 1995: 31).

(24) An elephant ?(when I saw it yesterday at the zoo) generally eats grass.

(25) ?Claudia generally left school at the age of twelve.

Despite its initial plausibility, though, the neo-quantificational analysis of generics needs some further refinement before it can yield a satisfactory solution to the semantics of genericity. An immediate problem is to pin down the set of restricted occurrences over which quantification will apply. Consider the following examples - where (26) and (28) are modifications of (3) and (16) respectively:

(26) The earth turns around itself.

(27) In Haiti, the sun rises at 6 o'clock.

(28) Claudia walks to school.

A developed logical form for these sentences would be as follows:

(26') GEN (s) [The earth moves in s; the earth turns around itself in s].

(27') GEN (s) [In Haiti the sun rises in s; the sun rises at 6 o'clock in s].

(28') GEN (s) [Claudia goes to school in s; Claudia walks in s].

The temporal intervals involved in the specification of the different situations in (26) to (28) may vary widely, and in any case cannot be part of the initial semantic representation of a characterising sentence. Instead they are the product of pragmatic inferential work, i.e. they result from processing each utterance against a set of contextual assumptions.[7] As a result, GEN in (26) comes out as quantifying over all situations in which the earth moves in any way; in (27) the domain of quantification is formed by situations in which the sun rises, i.e. only a subset of the situations in which the sun moves, separated by a one-day temporal interval; in (28) the generic operator ranges over the situations in which Claudia goes to school, which are again a subset of the situations in which she is active, separated by one-day temporal intervals (without taking into account weekends, holidays, or situations when she is not a pupil).

[7] The role of pragmatics in deriving non-overt restrictors has been recognised by several people in the literature on generics (see, for instance, Newton 1979, Kleiber 1985, Schubert and Pelletier 1987, 1989, Gerstner-Link and Krifka 1993).

More crucially, the neo-quantificational approach has to provide a more specific analysis for the semantics of GEN. In the next section, I want to examine some precise proposals about the semantics of the generic operator, and have another look at the interaction of semantic and pragmatic factors in the interpretation of characterising sentences.

6.1.2. The semantics of the generic operator

Of the various suggestions in the literature for specifying the semantics of the generic operator, I will discuss three, which have tried to account for generics using the notions of prototype, stereotype and relevant quantification respectively.

6.1.2.1 Prototypes

A number of people have suggested that generics involve - at least in some cases - quantification over prototypes (Nunberg and Pan 1975, Heyer 1985, 1990; cf. Platteau 1979). Recall that the basic idea behind most prototype models is that among the various members of a given category, there are some which are in a way more central or more 'representative' of the category as a whole (Rosch 1978). For instance, among various members of the category *bird*, one can distinguish some prototypical instances (such as sparrows or robins) which are closer to the prototype than others (say, penguins). Thus, the utterance in (29) would convey that all prototypical instances of birds fly:

(29) Birds fly.

On this view the generic operator may be broken down into the normal universal quantifier plus a specification on the restrictor to the effect that it picks out only typical members of each concept (this can take the form of a typicality operator, as in Heyer's analyses).

It is obvious that this approach simply replaces the problem of identifying the content of the GEN operator with the problem of pinning down prototypes for each category. The difficulty of this is well-known and has been the subject of vast research in cognitive psychology (for an overview, see Barsalou 1992); the current consensus seems to

be that there is no unique notion capable of subsuming the various, often ad hoc criteria for forming a prototype. This can be problematic if prototypes are taken to fulfil a *semantic* role in the representation of characterising sentences. A strict semantic line will often result in semantic incongruity. Compare:

(30) A duck has colourful feathers.

(31) A duck lays whitish eggs.

As Krifka et al. (1995: 47) point out, these examples are problematic since only male ducks have colourful feathers and only female ones lay whitish eggs. As the sets of male and female ducks are disjoint, the concept of typical duck is impossible to determine in a way suitable for both (30) and (31).

I will come back to this kind of attack on the prototype view in section 6.2. For the moment, suffice it to say that the prototype approach cannot but recognise that not all generics involve prototypes:

(32) Equilateral triangles have three equal sides.

The interpretation of (32) involves not prototypes but the definitional properties of the geometrical concepts in the proposition expressed. A similar example is the following:

(33) A bachelor is unmarried.

Bachelor is a concept with a widely acknowledged prototypical structure (see Lakoff 1987a). It is clear, though, that whichever way we specify the prototype for *bachelor*, it cannot be of much help in determining what is communicated by (33): the proposition conveyed says something about all unmarried male adults, not about all prototypical exemplars of them.

The question then arises: how is one to decide for a given characterising proposition whether it is to be interpreted with reference to a prototype or not? Heyer (1985) suggests that the kind of predicate will make clear whether it is assumed to be true of a kind as a whole or of the representative examples of a kind. He seems to believe that

this involves some sort of *semantic* information, which will become available to the generic operator; the latter is thus expected to 'contribute to an understanding of the semantics of *prototype* propositions, if prototype propositions indeed contain an explicit reference to the *typical representatives* of a kind' (Heyer 1985: 58, his emphasis). However, the appeal to a semantic typicality operator has to face a familiar set of objections to prototype semantics (Lakoff 1987b) - hence this approach may raise more problems than it sets out to solve. It is, therefore, preferable to think of a prototype interpretation of a generic proposition as being constructed on the basis of encyclopedic entries attached to concepts found in the predicate and the subject; this must involve some pragmatic mechanism constraining the accessibility and evaluation of encyclopedic information.

One might try to save a prototype approach in several ways. An obvious step would be to admit that the construction of prototypes depends on general cognitive and pragmatic considerations, and therefore falls outside the domain of semantics proper. It should be acknowledged that prototype formation takes into account multiple aspects of our encyclopedic knowledge, for which some sort of frame-based organisation is assumed. Within frames, prototypes represent the default values (i.e. the most frequently encountered values) of properties attributed to the members of a category. There is no reason to suppose - and in fact there is good reason to doubt - that each category has a single prototype (in other words, that the typicality operator picks out a unique member of a category every time). Frames allow for the representation of multiple prototypes (Barsalou and Billman 1989), especially when it comes to frequently encountered varieties of a certain kind. Applied to examples (30) and (31), this line of reasoning would predict that hearers use two prototypes for *duck*, which would assign to the two propositions their intuitively correct content.[8] As for examples (32) and (33), the present account would need some supplementary pragmatic machinery to explain why prototypes do not enter at all into the comprehension of these utterances.

Still, a prototype approach to generics fails to make the right generalisation, as is shown by two further types of example. First, certain generics involve ideal, rather than prototypical, exemplars of a category:

[8] Alternatively, one could assume that both (29) and the pair in (30)-(31) are interpreted with respect to a prototype which is unspecified for sex. This, however, seems to lack plausibility, especially as far as the pair in (30)-(31) is concerned and, in any case, will not work where there is considerable difference between the concepts for the male and female (e.g. there is no 'sex-neutral' prototype for *lion*).

(34) Postgraduate students work hard.

On the present formulation of the prototype approach, such uses are unaccounted for. Second, certain characterising sentences pose a problem:

(35) Mary cleans her room without hoovering under the bed.

It is hard to imagine what a prototype for a situation in which Mary cleans her room would look like. In any case, it does not seem to be a construct which is more or less ready-made and stored as such in the encyclopedic memory (as, for instance, prototypes for natural kinds may be). Given this sort of difficulty, it is probably no coincidence that prototype approaches to generics have been based on sentences containing natural kind terms rather than characterising predicates of the sort in (35).

One could go on to look for some way of dealing with the objections I have raised. However, the model as it stands cannot give a satisfactory unified account of the semantics of genericity.

6.1.2.2. Stereotypes

The theory of stereotypes initially formed part of Rosch's theory of prototypes; in philosophy, it is associated especially with the work of Putnam (see Putnam 1975). A stereotype is a list of properties typically assigned to the things a given predicate applies to. It differs from a prototype in that a) it is a list of characteristics rather than a typical member of a category; b) speakers may know the stereotype for some predicate but not actually be acquainted with any prototypes of it (e.g. *ghost, witch-doctor*, etc.). According to Putnam's (admittedly idiosyncratic) view, knowledge of stereotypes forms part of linguistic semantics and includes 'core facts' about the extension of a term, with which all speakers of the language should be acquainted. For instance, the stereotype of a tiger includes the predicate *striped*; this does not mean that all/most/normal tigers are striped (indeed stereotypes can be completely wrong), but that it is a widely acknowledged idea within a speech community that tigers are striped.

Let us apply this view to characterising sentences. Consider:

(36) Peacocks have richly ornamented tails with blue and green eyes.

(37) Peacocks are male.

Most speakers would accept (36) as true but not (37). Strictly speaking, that is surprising: (36) is less likely to be true for any arbitrarily chosen peacock than (37), since only male peacocks have richly ornamented tails and only a subset of these has tails with blue and green eyes. Adopting proposals by Geurts (1985) and Declerck (1986), one could argue that this difference is caused by the fact that (36) but not (37) expresses the stereotype for peacocks in our culture. If we take generics to involve universal quantification over the set of exemplars which satisfy the stereotype for a concept, then (36) comes out as true: stereotypical peacocks in effect have colourful tails. Since, furthermore, the stereotype includes no reference to maleness, (37) is correctly predicted to be false.

As a variant of the prototype approach, the stereotype-based view of characterising sentences encounters the same problems which made the prototype solution untenable. For instance, it cannot cope with terms which apparently lack stereotypes, such as characterising predicates of the sort we saw in (35). Even if stereotypes for such predicates could be determined, it is implausible that these form part of their linguistic meaning (as was argued for natural-kind terms like *tiger* or *peacock*). A related problem arises for predicates which do have stereotypes but where these seem inadequate to account for the content of the associated sentences. Consider *bachelor* again. According to Lakoff (1987a: 85), a stereotypical bachelor is taken to be muscular, pursue sexual conquest, date a lot of different women, hang out in singles bars, etc. One would then expect (38) to be true and (39) false:

(38) Bachelors live alone and want to date a lot.

(39) Bachelors live with their mothers and are afraid of dating.

Both examples, though, seem equally likely to be judged true. It turns out that - *pace* Lakoff - (39) conforms to another social stereotype, that of the introvert and dependent unmarried man. The existence of multiple (and possibly conflicting) stereotypes cannot be easily accommodated in a framework which attributes to stereotypes a *semantic* role; this would mean effectively that the predicate *bachelor* is semantically ambiguous, so that (38)

and (39) can both be true at the same time.[9] In addition, the postulation of widely diverging stereotypes, although empirically motivated, detracts from the initial plausibility and explanatory power of the notion of stereotype.

Furthermore, characterising sentences are not always interpreted with respect to a stereotype. Consider (40). Although the utterance captures the conventional belief that foxes are sly, on its preferred interpretation it would be taken to convey something about actual, real-world foxes, not the stereotype for foxes:

(40) Foxes are sly.

The stereotype-based analysis fails to predict the preferred reading of (40); more generally, it is unable to capture the fact that generics usually aim to make a claim of general validity about the actual world and not about culturally recognised norms. For all the above reasons, it seems that a stereotype-based account does not provide a suitable basis for an analysis of the semantics of characterising sentences.

6.1.2.3. Relevant quantification

The accounts discussed so far have assumed that genericity is essentially a semantic phenomenon, although the notions of prototype and stereotype have led us towards the semantics/pragmatics interface. By contrast, Declerck (1991) has put forth a purely pragmatic account of genericity. On his view, the generic operator might be spelled out as universal quantification over relevant entities. To determine the proposition expressed by (41), for example, we need to pin down the set of all relevant women for whom the generalisation is claimed to hold:

(41) Women are entitled to maternity leave.

[9] Another option would be to remove stereotypes from the semantic entry of predicates altogether and place them in the appropriate encyclopedic entries. I will not pursue this option further, since it would not fit the initial conception of stereotype; see, however, section 6.2.

The relevant set of entities is pragmatically specified on the basis of the hearer's world knowledge. Here the set of women claimed to be entitled to maternity leave is obviously the set of working women who are about to have a baby.

A problem with this approach is that little content is given to the pretheoretical notion of 'relevant' quantification. As Krifka et al. (1995: 46) are quick to point out, it is easy to find restrictions which would make *any* quantification come out true. In (42), if we take the relevant set of entities to be women who are bad conversationalists, we end up with a truism which is not what the utterance is intended to communicate:

(42) Women are bad conversationalists.

Although Declerck's analysis cannot be maintained as such, it contains one interesting idea, namely that the content of the restrictor of the generic operator in the proposition expressed by the utterance is the result of pragmatic processing. This idea will be taken up again in section 6.2. For the moment, I want to move on to a more promising approach to the semantics of characterising sentences.

6.1.3. GEN as a modal operator

A number of people have proposed that generics can be best handled by a possible-worlds semantic framework, on a par with a variety of modal phenomena (Dahl 1975, Heim 1982). More recently, Kratzer's (1981a) framework for modality has been extensively used to model intuitions about the content of various characterising sentences (see, e.g., Gerstner-Link and Krifka 1993, Carlson and Pelletier 1995, Carlson and Spejewski 1997).

Recall that, on Kratzer's analysis, modality involves three factors: a modal relation (basically: possibility or necessity), a modal base (or conversational background) and an ordering source (cf. section 2.1.3.1). Kratzer's theory recognises a variety of modal bases and ordering sources (realistic, teleological, deontic, etc.), the interaction of which yields the variety of interpretations of modal expressions. Consider (43):

(43) Participants in the conference must wear their name tags.

What the utterance communicates is that, in all worlds closest to normal (ordering source) which satisfy the conference regulations (deontic conversational background), participants in the conference wear their name tags; in other words, (43) is interpreted as a deontic necessity.

Going back to the analysis of characterising sentences, it has been suggested by Heim (1982) that the generic operator could be construed as the modal operator of necessity. Consider the utterance:

(44) Dogs have four legs.

(44') GEN (x) [x is a dog; x has four legs].

What (44) conveys, on the modal view, is the following: everything which is a dog in the worlds of the modal base is such that, in every world which is closest to normal according to the ordering source, it will have four legs. On its preferred reading, (44) requires a realistic modal base, that is, it is interpreted according to the set of facts assumed to hold in the actual world; thus the possibility is left open for dogs in other sorts of worlds (e.g. in science fiction) to have a different number of legs.

(44) can also be ascribed analytic status, in which case quantification will range over all possible worlds - including the actual one: everything that is a dog in those worlds will have four legs under conditions closest to normal (cf. Burton-Roberts 1977). Note that in neither case do exceptions (e.g. three-legged dogs) falsify the statement made by (44): what is being conveyed is merely that a world where dogs have four legs is more normal than a world in which dogs don't have four legs.

By allowing for variations of the modal base and the ordering source, the modal approach aims to explain the multiplicity of generic interpretations:

(45) Paul smokes.

The utterance is interpreted according to a stereotypical modal base and ordering source; it explicitly communicates that in all worlds most similar to the world in which Paul shows his typical behaviour, whenever it is appropriate, Paul smokes. In order to make a generalisation about typical behaviour, one needs some evidence from actual (and probably

recurrent) behaviour; this accounts for the fact that (45) is felicitously uttered in case Paul has been observed to smoke. On the modal analysis, a situation where Paul is given an appropriate chance and does not smoke is not inconceivable, but is more remote from normalcy.

A stereotypical modal base can also account for the interpretation of example (36), repeated below as (46):

(46) Peacocks have richly ornamented tails with blue and green eyes.

Note that the modality-based approach avoids the disadvantages of the stereotype-based approach to characterising sentences, since it correctly recognises that some but not all genericity can be explained through a stereotypical conversational background and ordering source.

(47) A Christian is forgiving.

This example involves a deontic modal base (and ordering source), consisting in particular of those possible worlds in which religious and moral obligations hold: every Christian in the most normal circumstances is forgiving in those worlds. (47) does not make a statement about *actual* Christians but only about Christians in ideal (deontic) worlds; in fact, (47) does not even presuppose/imply the existence of Christians in the actual world, since the actual world does not belong to the modal base. It follows that actual nonforgiving Christians are not counterexamples to this generalisation (cf. the remarks on (44) above).

The picture I have outlined is certainly appealing as an abstract description of how the semantics of modality and characterising sentences are related. The application of Kratzer's original proposal to generics manages to bring together two areas which have clear conceptual affinities - indeed, I take it that the above formal semantic account of characterising sentences establishes that any unified analysis of generic predication should involve reference to modal notions. However, for reasons explained in chapter 2, the formal semantic approach to modality does not aim to offer a psychological account of how modal expressions are being understood; consequently, its extension to generic phenomena inherits the drawback of psychological implausibility.

Apart from its lack of interest in a cognitively realistic model of utterance comprehension, the formal modality-based account of generics faces difficulties even within its proper domain of explanation. For instance, the above analysis does not account for a gap in the distribution of generic interpretations: unlike modal expressions, there seem to be no characterising sentences which admit an epistemic conversational background. (48) lists several characterising sentences which require different conversational backgrounds for their interpretation; I could come up with no similar example involving an epistemic conversational background:

(48) a. Women lie about their age. (stereotypical)
b. Women are ethereal creatures. (ideal)
c. Women care for their children. (deontic)
d. Women are paid lower salaries than men doing the same job. (realistic)

Secondly, the modality-based approach is unable to resolve potential clashes in the selection of modal bases and ordering sources. Consider the following examples from Krifka et al. (1995: 56):

(49) A turtle is long-lived.
(50) A pheasant lays speckled eggs.

Following the modal definition of GEN, (49) is true if and only if every turtle in the modal base is long-lived in all the most normal worlds with respect to the ordering source. The sentence should be evaluated against a 'realistic' background, in which the laws of biology hold. However, the worlds in which no turtle ever dies a premature death are themselves biologically highly abnormal (since they exclude, among other things, the presence of predators). This is a case where normalcy conditions contradict each other: the laws for a single organism are not compatible with the laws for a whole ecosystem. In (50) we again construct an interpretation according to biological normalcy. The proposition expressed is true if and only if every pheasant in the worlds of the modal base lays speckled eggs in every most normal world. To capture the intended construal of the universal quantification, we need to consider only worlds containing pheasants able to lay eggs (i.e. female fertilised

pheasants). However, according to the laws of biology, such worlds should also include male pheasants for fertilisation to take place; and of course such pheasants would not lay eggs. It is very unlikely that such considerations would arise naturally (and hence cause difficulties) in the comprehension of (49) and (50); however, they present problems for a truth-based formal semantic model of generics which does not allow enough room for pragmatics in the construction of the proposition expressed by the utterance.

To sum up: although the modal approach to characterising sentences offers interesting insights into their semantics, the way it is set up acts as a barrier to its psychologically plausible application. Obviously, the question to ask is: how can the insights of the formal approaches be integrated into a psychologically sound account of utterance interpretation? This is the issue I address in the next section.

6.2 Modality and characterising sentences: some suggestions

6.2.1 Genericity in the proposition expressed: the role of pragmatics

My purpose in this section is to show how the interpretation of characterising sentences can be accounted for within a cognitively plausible semantic and pragmatic framework. I will, therefore, concentrate on a number of context-related factors which have normally been ignored by formal analyses. I take it that pragmatic considerations will prove crucial in determining the answers to the following basic questions about generics:

(i) Where does genericity come from? What determines the presence of GEN in the proposition expressed by the utterance?

(ii) What is the correct semantics for GEN?

(iii) Assuming that the tripartite structure associated with the generic operator is right, what determines the partitioning of a characterising sentence into matrix and restrictor? If the restrictor is implicit, how is it determined?

(iv) How are the various interpretations (prescriptive, stereotypical, etc.) of generics to be derived?

(v) How are we to account for the intuition that the generalisations conveyed by different generic sentences may involve different grounds (i.e. amount and type of instances

covered by the generalisation) and show different degrees of sensitivity to counterexamples?

In this section, I want to summarise the position I will adopt with respect to (i) - (iv) (I will leave the last issue for a later stage in the discussion). I start with some observations on what causes generic interpretations.

Recall that, lexical characterising sentences aside, characterising interpretations may arise in given examples as a result of the interaction of a variety of semantic and syntactic factors such as the aspect of the predicate, the nature of the article of the subject NP (definite/indefinite), the presence of adverbials, etc. In other words, there seems to be no straightforward association of genericity and overt/specialised grammatical marking. This conclusion receives considerable cross-linguistic support. Dahl (1995), after researching a large amount of cross-linguistic material on characterising sentences, concludes that natural languages follow a Minimal Marking Tendency with respect to generics: that is, generic sentences either lack overt tense-aspect marking or they use the least marked form available within the morphological system of the language. Furthermore, whatever form is used for generics is also used in other, non-generic environments. Even in the fairly small number of languages where there seem to be explicit grammatical markers of genericity, their semantics is not always clear.[10] In addition, in those cases generics sometimes share their expression with other types of sentences. In conclusion, it is difficult to find clear grammatical distinctions that coincide with the episodic/generic distinction; as Dahl puts it, the generic/non-generic distinction 'more often than not is only indirectly reflected in speakers' grammatical choices between grammatical markers' (1995: 425).

It seems thus that predicate genericity lacks a systematic and univocal linguistic realisation. Rather, a variety of lexical and grammatical means may serve to indicate (not always decisively) that a generic interpretation is intended. It is an empirical issue to what extent linguistic factors streamline generic interpretations; moreover, specific constructions are bound to give rise to different instantiations of the Operator-Restrictor-Matrix schema.

[10] Krifka et al. (1995: 8) give the example of Swahili which includes the verbal prefix *hu-*, standardly taken to encode habituality. As the authors add, such markers are only a sufficient, and not a necessary, condition, for a generic reading: the same meaning in Swahili could be expressed using the present tense. Comrie (1985: 40-1) is also cautious about such examples and rejects the idea of a habitual or a universal tense, underlining the importance of pragmatic factors in the derivation of generic meanings in tense-aspect-modality systems.

In the following discussion of generic sentences it should, therefore, be borne in mind that genericity is generally not encoded by specific predicates: the property of expressing a generalisation (which lies at the heart of the generic phenomenon) is best seen as setting up a broad conceptual space, a notional category which subsumes constructions which may otherwise not form a natural class.[11] Within this conceptual space, certain sentences may contain a tripartite structure with a generic operator as part of their logical form (e.g. when an adverbial such as *always*, *generally*, etc. is present in the surface structure); on other occasions, the generic operator will not be 'plugged into' the semantic representation of the utterance (the logical form) but its presence or absence will depend on the pragmatic manipulation of an underdetermined syntactico-semantic input.[12]

For the purposes of this chapter, I will take as a starting point the stage where the (incomplete) propositional form of the utterance assumes the familiar tripartite structure I have described in the previous pages (this might already correspond to the logical form of the utterance, or it may be the product of some intermediate, contextually-informed processing). This structure may be indeterminate along a number of dimensions. A first such dimension has to do with the semantic content of the operator GEN, which is extremely schematic: here, I partly follow the modal proposal in assuming that GEN is the modal operator of necessity and involves universal quantification over contextually specified sets of particulars (alternative states of affairs/cases); nevertheless, I differ from previous proposals in that I take GEN to make an appeal to relevant domains of quantification along the lines proposed for modals in chapter 2. The type of these domains will naturally determine the type of interpretation generics will receive. A second dimension of indeterminacy in the propositional form of generics concerns the partitioning of the characterising sentence into restrictor and matrix; the division may be only partly specified by the surface structure of the sentence. For instance, several ways of dividing the sentence may be linguistically permissible; alternatively, the sentence may contain no overt (i.e. phonologically realised) restrictor. These dimensions of indeterminacy in the initial representation of a characterising sentence will be resolved pragmatically during the

[11] To the extent that genericity crucially involves pragmatic properties, talk of characterising *sentences* should be recast in terms of characterising *utterances*.

[12] This proposal goes against the purely syntax-driven approach of Diesing (1992). I should note here a difference from kind-referring NPs, for which it can be strongly argued that the generic interpretation is purely a result of pragmatic considerations (e.g. no generic article has been found cross-linguistically; cf. Nunberg and Pan 1975, Nunberg 1978, Smith 1975, Marmaridou 1984, Kleiber 1985, Krifka et al. 1995, Dahl 1995).

development of the schematic propositional form into the proposition expressed by the utterance.

Consider the example in (51):

(51) A man doesn't cry.

(51') GEN (x, s) [x is a man & x is in s; x doesn't cry in s].

The explicitly communicated content of (51) can be paraphrased as follows: 'In those cases in which the circumstances would cause one to cry, a true man doesn't cry'. How is this interpretation arrived at? Assuming that GEN is equivalent to the modal operator of necessity, the interpretation of (51) relies on a contextually supplied set (domain) of assumptions which will restrict the range of the modal operator. Specifically, the restrictor for (51) contains two sets of assumptions: one set pertains to the subject and narrows down its denotation to true men; the second set of assumptions pertains to the predicate and specifies under which conditions the predicate is supposed to hold of the subject - in this case, circumstances in which it would be appropriate to cry. Finally, the usual restrictions on the range of assumptions which are being taken into consideration in the modal restrictor hold: only the most accessible and better evidenced ones will enter the 'background' for a characterising sentence. A fuller (more developed) representation of the logical form of the utterance is given in (51"):

(51") GEN (x, s) [x is a man* & s is an appropriate situation for crying & x is in s; x doesn't cry in s].

The construction of the concept MAN* out of the encoded content of *man* is an instance of what I have called 'ad hoc concept formation' (cf. chapter 1): the new concept is a narrowed-down version of the original concept of MAN with a more or less sizable encyclopedic entry which contains properties of an accessible stereotype for men (that they do not show weakness or emotion, they are strong, etc.). The construction of the (unspecified) restrictor for (51) is thus the outcome of mutual adjustments of hypothesised propositional form, context and cognitive effects guided by relevance considerations: for instance, the concepts of the matrix (NOT CRY) raise the accessibility of the ad hoc

concept MAN*. There need be no more detailed specification of the circumstances in which it would be appropriate to cry in order for the restrictor to be understood; I assume that such fuller information belongs to the context and can be accessed through the conceptual addresses in (51").

In a sense, this pragmatic-inferential approach starts from similar premises as Declerck's (1991) idea of 'relevant quantification', and enriches the pretheoretic notion of relevance with more specific constraints placed by both the speaker's intentions and general encyclopedic information. To illustrate further, consider (52):

(52) Prima ballerinas receive flowers from the audience.

The generalisation in (52) describes what typically happens after a ballet performance, in case there is a prima ballerina, the performance is good, there is an enthusiastic audience, and so on. All these conditions may be called *felicity conditions* for the state of affairs described by the matrix proposition in (52) (after Searle's term for performatives)[13]: they are background assumptions which form part of our encyclopedic knowledge of ballet performances and are crucial for the comprehension of (52).[14] A broad specification of such felicity conditions (e.g. an after-performance-situation) forms the restrictor for the generic proposition in (52) and features in the proposition expressed by the utterance.

The above account of genericity bears similarities to the account of modality advanced in the main body of this thesis. Characterising sentences convey generalisations over cases which are not always actual; in this sense, they involve non-factual (i.e. stereotypical, ideal, etc.) domains. For reasons explained in chapter 2, these non-factual domains rely to a large extent for their structure on the factual domain (thereby maintaining a high degree of similarity to it), unless there are specific reasons for departing from what holds in the actual world when constructing alternatives to actuality. Frequently, the interpretation of generics draws on 'collapsed' modal domains, i.e. narrowed versions of single concepts: the ad hoc concept in (51) is a case in point. Moreover, generics, along with modals, pose interesting questions as to the precise content of the assumptions which serve as the background to the generic/modal operator. In (51), for instance, one might

[13] The idea to apply Searle's terms to generics was mentioned in Chierchia (1995).
[14] In fact, such background assumptions are crucial for other respect of the comprehension of (52); e.g. the assignment of (so-called 'bridging') reference to *the audience*.

wonder how the exact content of the restrictor is to be specified: as before, I assume that our beliefs about causality and law-like dependencies among states of affairs constained by considerations of relevance will guide our inferential search for the appropriate restrictive domain. A final parallel with modality involves the degree to which background assumptions need feature in the proposition expressed: a full specification of the restrictor normally forms part of the context rather than the proposition expressed by the utterance, and will not be recovered unless specific cognitive effects are expected.

6.2.2 Restricting the domain of the generic operator

In this section, I am going to show how pragmatic considerations can be employed to shed light on the variety of interpretations characterising sentences may receive in context. I will concentrate mostly on examples with no overt restrictor, thereby leaving out examples such as (53), where there is some linguistic indication of the restrictor in the italicised phrases:

(53) a. Police help civilians *in emergencies.*

b. People *who take part in bullfighting* are in danger.

c. *When the two teams play*, Arsenal wins.

d. Animals *crowded together in a small cage* become depressed.

I will start with some examples involving bare plurals. Consider (54):

(54) Electrons are negatively charged.

(54') GEN (x) [x is an electron; x is negatively charged].

The restrictor here involves members of the category ELECTRON. Since being negatively charged is part of the logical entry for the category, the restrictor will range over all instances of the concept ELECTRON. This is the reason the generalisation in (54) does not admit exceptions. Similarly for (55):

(55) Lions are animals.

(55') GEN (x) [x is a lion; x is an animal].

The situation in (56) is rather different:

(56) Bears are ferocious.

Unlike (55), (56) does not rely on essentialist information about natural kinds. In the previous example, whatever fact makes something a lion simultaneously guarantees that it will also be an animal. Here, ferociousness is a contingent property of bears. One way of construing (56) is to take it as a claim about typical bears; this would involve an ad hoc concept of BEAR which would include the properties standardly attributed to bears by folk imagination. Another way of interpreting (56) is to consider it as a claim about bears in specific circumstances (e.g. when agitated, etc.): the second option would involve a more detailed specification of background assumptions in the restrictor (cf. the two interpretations of (40) above).

(57) Soldiers protect their country.

The restrictor in (57) appeals to ideal situations, in which soldiers perform their duty. As in previous generics involving non-factual domains, (57) is sealed off from making a claim about real-world soldiers; the failure of armies to protect their country in a specific crisis, therefore, does not bear on what (57) communicates. Likewise, (58) involves a state of affairs in which children behave in an ideal/desirable way:

(58) What do children say? They say 'please'.

Let me move on to a different type of example:

(59) Dutchmen are good sailors.
(60) Italians are excellent cooks.

At first sight, (59) and (60) might be taken to express a generalisation about Dutchmen or Italians of the type we have been considering so far; on this view, (59) would be given the

(incomplete) propositional representation in (59'):

(59') GEN (x) [x are Dutchmen; x are good sailors].

However, the utterance does not, in fact, convey that every Dutchman is expected to be a good sailor. Another possibility would be to interpret (59) as a generalisation about Dutchmen who are sailors: (59) would then assume the form in (59"):

(59") GEN (x) [x are Dutchmen & x are sailors; x are good sailors].

Still, this formulation misses the point that (59) is not a statement about a subset of Dutchmen: somehow, what the utterance communicates picks out a specific and identifiable property of Dutchmen which serves to differentiate them from other comparable nations (this is what Krifka et al. (1995: 83) call the 'distinguishing property' interpretation). The subject NP in (59) is a kind-referring phrase, as the unacceptability of (61) demonstrates:

(61) ?A Dutchman is a good sailor.

I want to propose that the distinguishing property interpretation can be captured in pragmatic terms. Notice first that the comprehension of (59) involves appeal to the stereotype for Dutchmen: this underlies the paraphrase proposed by Krifka et al. (1995: 82) for (59): 'The Dutch are known to have good sailors'. It also explains the discrepancy between (a) and (b) in (62) and (63):

(62) a. Italians are good singers.
b. ?Italians are good athletes.

(63) a. Brazilians are good football players.
b. ?Brazilians are good swimmers.

Good singing belongs to the stereotype for Italians as a nation, whereas being a good athlete does not; likewise, playing good football is a stereotypical attribute of Brazilians, whereas being good swimmers is not. If this is right, (59') can be retained as the correct

representation for (59), as long as it is developed into a full propositional form in which the generic operator ranges over stereotypical instances of Dutchmen. Of course, within the set of Dutchmen who satisfy the stereotype, there will be several who are not interested in sailing: the predicate will, therefore, apply only to those Dutchmen who are actually sailors. However, this is not an assumption which we need to incorporate in the proposition expressed by (59): the fact that being a sailor is a prerequisite for being a good sailor is part of the felicity conditions for the predicate in (59), i.e. the general background for the comprehension of the utterance.

So-called dispositional and habitual sentences can be dealt with quite straightforwardly in this framework. Consider:

(64) Canon ZX303 makes colour photocopies.

(65) This car goes 200 kph. (from Schubert and Pelletier 1989)

An utterance such as (64) communicates that, as far as the functional specifications for this particular type of machine are concerned, Canon ZX303 makes colour photocopies. Similarly, in (65) the claim is that, as far as its functional specifications go, a certain kind of car reaches the speed of 200 kph. These generalisations can be seen as the mechanical counterpart of biological essentialist statements of the type *Turtles live a long life.* One way of treating them would be to adopt as the restrictor a set of *archetypes.* An archetype can be seen as an exemplar of a category which fulfils its functional design; in this sense, it is similar to a stereotype or an ideal. In the case of artifact categories, functional properties are particularly important, since in everyday interaction artifacts are manipulated and used for certain purposes: so (64) and (65) are statements about archetypical members of the category denoted by their subject (where the representation of archetypes is another case of ad hoc concept formation).

Schubert and Pelletier (1989: 216) give a different analysis for such dispositional readings (which they call 'capacity' readings). In their view, the content of these utterances does not include a restrictor (or 'reference ensemble', as they call it); instead, they assume that it involves 'an implicit 'is-able-to' operator which modifies the overt predicate' (ibid.). For instance, (64) is equivalent to the claim that Canon ZX303 has the capacity to make colour photocopies. On my approach, this reading is no

different from other generic readings surveyed above: what causes the 'capacity' interpretation is the type of restrictor which is required for understanding the utterance (viz. the set of archetypical members of the category). In this respect, my analysis is closer to those of Laca (1990) and Krifka et al. (1995).

There is another reading for the example in (65), the habitual reading. Here, a claim is being made with respect to the factual domain and the restrictor includes a specification of the felicity conditions under which reaching 200 kph can be attained by a specific kind of car. The dispositional and habitual readings for (65) are brought out respectively in the two representations below:

(65') a. GEN (x) [x is this car*; x goes 200 kph].

b. GEN (x, s) [x is this car & x is in s; x goes 200 kph in s].

(65'b) is similar to other habitual propositions, such as:

(66) Pamela wears make-up.

(66') GEN (x, s) [x is Pamela & x is in s; x wears make-up in s].

(67) Brian drinks.

(67') GEN (x, s) [x is Brian & x is in s; x drinks in s].

It is often observed that habituals of the above type pose two problems for a genericity-based analysis (Kleiber 1985, Krifka et al. 1995). Firstly, the type of restrictor required for their comprehension is more difficult than usual to determine: in (66) and (67), its content cannot be specified further than as some set of appropriate conditions - hence the pragmatic completion of the underdetermined semantic content of these utterances is much weaker than usual. Secondly, the (developed) logical forms in (66') and (67') seem to involve an unnecessary redundancy, since they make appeal to normalcy conditions in two places: (67'), for instance, may be interpreted as conveying that, in all normal situations, Brian normally drinks. However, none of these points is particularly problematic for the pragmatic approach I have outlined. It is true that the felicity conditions of habituals such as (66) and (67) are hard to determine: moreover, it appears that the comprehension of these utterances requires nothing more than a sketchy specification for them. This is allowed for

by the account of genericity I have proposed, as long as no particular cognitive effect hinges on the fuller representation of the restrictor. As for the second issue, normalcy/felicity conditions need be specified only once with respect to the restrictor: on this view, (67) communicates that, in all cases in which the appropriate circumstances arise, Brian drinks. If in some apparently appropriate instance (e.g. a party), Brian does not drink, some background condition is not fulfilled (he may not be allowed to drink due to medication, etc.). In this way, the problem of multiple normalcy conditions does not arise.

I now want to turn to characterising sentences with singular indefinite subjects. This class differs from characterising sentences with bare plural subjects, on which I have concentrated so far. Recall that in (51) - repeated below as (68) - the type of modal restrictor made crucial reference to assumptions about true/genuine exemplars of the category denoted by the subject; more examples are listed in (69)-(70):

(68) A man doesn't cry.
(69) A gentleman opens doors for ladies.
(70) A knife has a sharp and a blunt edge.

The preferred interpretations of these utterances can be paraphrased through the use of hedges as follows:

(71) A true man doesn't cry.
(72) A true/genuine gentleman opens doors for ladies.
(73) A proper knife has a sharp and a blunt edge.

There is a second, related group of examples. Consider:

(74) A circle is a shape.
(75) A cat is a mammal.

These sentences have definitional status: they hold in virtue of logical facts about the concepts CIRCLE and CAT. Here, the paraphrases with *true/real* are not appropriate, since the characterising sentences in (74)-(75) do not communicate something about

true/genuine exemplars of a category but rather something which holds for all exemplars in virtue of having certain logical properties. There is yet a third class of characterising sentences with indefinite singular subjects:

(76) A zebra has stripes

(77) A tiger eats a lot of meat.

These utterances require for their interpretation reference to the prototype for zebras and tigers respectively; permissible paraphrases are given in (78)-(79):

(78) A typical zebra has stripes.

(79) A typical tiger eats a lot of meat.

I want to claim that these three clusters of interpretations of characterising sentences containing indefinite singular subjects can be reduced to one. An initial indication that the present classification misses a generalisation comes from the fact that there seem to be restrictions on the felicity of generics with an indefinite singular subject; for instance, it is not possible to interpret (80)-(81) using a typicality restrictor, although farmers typically receive state subsidy and Nobel prize winners typically work hard:

(80) ?A farmer receives state subsidy.

(81) ?A Nobel prize winner works hard.

Likewise, it appears that certain characterising sentences which unproblematically take bare plural/definite singular subjects form unacceptable utterances with indefinite singular subjects:

(82) a. ?An Englishman drinks beer.

b. Englishmen/The English drink beer.

c. An Englishman is brave.

(83) a. ?A madrigal is popular.

b. Madrigals/The madrigal is popular.

c. A madrigal is polyphonic. (from Lawler 1973)

A unified account of characterising sentences with indefinite singular subjects might go as follows. The interpretation of such sentences requires the presence in the restrictor of an ad hoc concept describing the *core properties* of the class denoted by the sentential subject. Core properties are identical to neither definitional/analytic nor typical properties of a category - although they may occasionally overlap with either one of these: rather, they can be defined as highly accessible information which is incorporated into all of an individual's category representations across situations (cf. the definition of 'context-independent' properties in Barsalou 1989). As a result, any random member of the category can be expected to exhibit these core properties. Generic examples with indefinite singular subjects become felicitous, so long as a certain member of the category may be viewed as representative of the category as a whole, and therefore expected to possess core properties of the whole class. In this sense, indefiniteness in singular NPs is closely linked to class membership (see de Swart 1996, Kleiber 1985, Nunberg and Pan 1975).

On the proposed analysis, the presence of indefinite singular subjects in generics constrains the type of admissible restrictor in the tripartite quantificational structure in a specific way. Consider (84) below, which is intended as a summary of possible interpretations of characterising sentences with indefinite singular subjects:

(84) a. A lion is an animal.
b. A lion is a king.
c. A lion has a mane.

(84a) is acceptable, since being an animal is a core (logical/analytic) property of lions. In (84b) the core properties involved are not definitional: instead, they are highly accessible properties which correspond to a cultural stereotype about lions (i.e. a property of any true, 'properly called' lion is that it is king of the jungle). Finally, (84c) is interpreted with respect to a typicality restrictor mainly constructed out of perceptual attributes for lions. As (84) shows, the domain of essential/analytic properties is only the limiting case for the interpretation of this class of generics: more generally, characterising sentences with singular indefinite subjects display quasi-analyticity (Burton-Roberts 1977), in the sense

that the property predicated of the subject is somehow guaranteed by/immediately inferable from the fact that the subject belongs to the class it does.[15]

Against this background, the unacceptability of certain generic constructions with indefinite singular subject NPs is easily explicable. In (80), it is presumably true of the typical farmer that he receives state subsidy; however, this is not a core property of farmers in general - i.e. it has low accessibility even within the prototype for farmers, and therefore cannot supply the domain for the interpretation of the utterance. A similar account can be given for (81): the property of working hard, although probably inferable from other assumptions in the typical representation of a Nobel prize winner, is not itself highly accessible/central and therefore the utterance is infelicitous.

Moving on to (82) and (83), it is evident that such constraints do not hold for characterising sentences with bare plural or singular definite subjects. As for the discrepancy between the (a) and (c) examples in this pair, it can again be attributed to a difference in centrality/accessibility of the properties predicated of the indefinite subjects. In (82), it is a highly accessible typical trait of Englishmen that they are brave, but not that they drink beer. In (83), the property of being popular is less central to the category of madrigals than the property of being polyphonic - hence the marginality of (83a) when compared to (83c).[16]

I will not discuss other types of characterising sentences. As I mentioned above, there is no restriction on the kind of subject a generic sentence may take and, obviously, different types of subject (e.g. mass terms) will bring about modifications in the basic analysis of genericity. Since my aim here is to offer only the bare bones of such an analysis, I will go on in the next section to compare this account with a formal modal approach to genericity.

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[15] It might seem that the interpretation of some generics with indefinite singular subjects requires domains of ideals:

(i) A Christian is forgiving. (= (47))

(ii) A gentleman opens doors for a lady. (= (69))

However, notice that the subjects above include evaluative/moral terms: a true/typical Christian or gentleman is already an ideal exemplar in some scale of religious/moral/social, etc. values. Compare the unacceptability of (iii): the utterance cannot be readily understood as a claim about ideal lecturers:

(iii) ?A lecturer is punctual.

[16] A relevance-theoretic analysis of indefinite descriptions has been given by Rouchota (1994b). Rouchota mentions generic interpretations towards the end of her paper; she considers them products of ad hoc enrichment of a unitary semantic content for indefinite descriptions. Our approaches are, I think, very similar; unfortunately, a fuller discussion of this point lies outside the scope of this chapter.

6.2.3 Some comparisons

There are several differences between the pragmatic account of genericity proposed here and the original joint treatment of modals and generics in formal frameworks. I will concentrate on a couple of difficulties for the original (formal) modal account of genericity which its modified pragmatic counterpart escapes. Recall the pair in (49)-(50), repeated below for convenience:

(85) A turtle is long-lived.

(86) A pheasant lays speckled eggs.

(85) was problematic because natural laws for turtles clash with natural laws for the ecosystem to which turtles belong and, consequently, it is difficult to determine the sort of possible worlds which form the restrictor (or modal base) for (85). Similarly, in (86) quantification intuitively ranges over worlds which include female fertilised pheasants only; nevertheless, normalcy considerations suggest that such worlds have to include male birds as well. Notice that these problems disappear if we rely on relevance considerations to constrain the size of the restrictor for the generic operator. In (85), one cannot escape the intuition that the utterance should be interpreted with respect to those biologically possible worlds which contain (basically if not solely) turtles: this is the only relevant aspect with respect to which these worlds will be compared. In the modified modal framework, this intuition is respected: (85) is taken to convey that, as far as their biological make-up is concerned, turtles are long-lived. This collapsed domain does not inflate the generic restrictor beyond those assumptions which are necessary for the interpretation of a given characterising sentence; rather, the relevant assumptions for the construction of this restrictor now come from the assumptions stored under a single concept.[17] Likewise for (86), which gives rise to the semi-propositional form in (86'):

[17] In fact, (85) can be interpreted with respect to a factual domain as well (i.e. as a claim about real-world turtles), in which case it will probably be judged false. The possibility of two different interpretations is manifested in the fact that (85) can be followed by two kinds of response:

(i) Yes, a turtle lives even longer than a frog.

(ii) No, a turtle rarely survives the dangers in its environment.

(86') GEN (x, s) [x is a pheasant* & s is an egg-laying situation & x is in s; x lays speckled eggs in s].

Pragmatic considerations will flesh out further conditions for the situation in the restrictor: in accordance with our factual knowledge about egg-laying behaviour in birds, (86) will be understood as a claim about female pheasants only (indicated by the ad hoc concept for PHEASANT in (86')).

The more general issue behind this difference in the two accounts has to do with the extent to which the content of the modal restrictor (what I have above called the 'felicity conditions' or background for a generic) needs to be represented during the comprehension of a generic. Within a possible-worlds framework, it is often acknowledged that propositions are organised in locally dependent networks, so that the introduction of a new proposition into a world will bring chain modifications in other parts of that world due to existing networks (or 'lumps' - see Kratzer 1989 and section 2.3.2 above). In generics, this position creates restrictors which are too big (:inclusive). However, as I have hinted at various points, when it comes to the psychological representation of restrictors, considerations of processing effort ensure that only aspects which may yield cognitive gains will be accessed and processed during utterance comprehension. Very often a broad specification of the restrictor suffices for purposes of understanding; for instance, in (86') a fuller specification of the content of s might look like (87):

(87) s is an egg-laying situation in which the bird is healthy, there is no natural catastrophe immediately after egg-laying, etc.

It appears that, in the absence of indications to the contrary, hearers assume that the partial specification of the restrictor they recover can be fleshed out in keeping with some standard of normalcy (:our set of better evidenced and most accessible factual assumptions). As in the account of modality presented in chapter 2, a pragmatically informed approach to generics can draw a distinction between comprehension and inference. What is necessary for understanding a characterising utterance is normally the recovery/construction of a set of felicity conditions for the predicate to hold; the broad description of the restrictor may enable the hearer to draw further inferences as to the

exact content of this domain, although these inferences are not part of the proposition expressed by a generic. The distinction is of necessity collapsed in truth-based formal frameworks, in which the specification of the truth conditions for generics profits from an explicit representation of the conditions under which the predication is assumed to hold of the subject.

A second point which posed some difficulties for a Kratzer-style approach to generics is the absence of characterising sentences which require/allow as a restrictor an epistemic conversational background. The crucial example was (48), repeated below as (88):

(88) a. Women lie about their age. (stereotypical)
b. Women are ethereal creatures. (ideal)
c. Women care for their children. (deontic)
d. Women are paid lower salaries than men doing the same job. (realistic)

This discrepancy in the use of modal bases in generics has not been commented on in the literature so far. I propose that the unavailability of epistemic modal bases in characterising sentences can be explained in a principled way by the metarepresentational account of epistemic modality. To take a concrete example, an epistemic interpretation of (88d) would be something along these lines: it follows from the set of all assumptions in the speaker's belief-set that women are paid lower salaries than men doing the same job. As expected, a true epistemic reading requires that the speaker considers the set of her beliefs as such and derives a generalisation on the basis of data in that set. Now, apart from the empirical fact that such readings of generics are not warranted, there are conceptual reasons for the unacceptability of epistemic characterising propositions. Generics convey generalisations about states of affairs in the actual world or in alternative realities, and thus appeal to a variety of factual and non-factual propositional domains: they cannot, however, communicate generalisations *about contents of mental states*. It would be hard to justify the cognitive gains from such a move: although the domain of the speaker's beliefs is (roughly) co-extensive with the factual domain, setting up a metarepresentation increases the amount of processing effort required to understand the utterance - and this does not appear to be offset by different/additional cognitive effects. The conclusion is that

cognitive economy considerations block the use of one type of restrictor in generics which is freely available and employed in modal environments. An extensional account, on which epistemic and factual worlds both correspond to objective states of affairs (but simply involve 'a different categorization of the facts' - Kratzer 1981a: 52) cannot explain why factual but not epistemic backgrounds are capable of functioning as restrictors in modality-related environments such as generics.

There is a final important difference between my account and its formal semantic counterparts: the role of grounds for the truth of a generic proposition. I will devote the last section to this issue.

6.2.4 Inferring the grounds for generics

It is often observed in the literature that the generalisations conveyed by different characterising sentences vary considerably with respect to the number of instances covered by the generalisation - and hence the tolerance exhibited towards counterexamples. To illustrate, I will borrow a scale from Schubert and Pelletier (1987: 387):

(89) a. Snakes are reptiles.
b. Telephone books are thick books.
c. Guppies give live birth.
d. Italians are good skiers.
e. Frenchmen eat horsemeat.

As the authors remark, the truth of each of the above examples calls for different relative numbers of instances of the subject terms satisfying the predicate term: In (a), it is all; in (b) most; in (c) some subset of the females (less than half); in (d) some small percentage, but still higher than in other countries (which is why the sentence ascribes a characteristic, distinguishing property to Italians); and in (e) probably a small percentage (although this is striking enough to be sufficient). This asymmetry has important consequences for the verification of generic sentences: the discovery of a single snake which is not genetically a reptile would be catastrophic for (89a), whereas the existence of many Frenchmen who do not eat horsemeat does not affect the truth of (89e).

Another well-known example comes from McCawley (1981):

(90) a. Doctor Novotny practises lobotomies.

b. Doctor Novotny votes for Democrats.

McCawley suggests that, although both examples involve the Doctor's typical behaviour, the truth of (90b) requires more instances of the action denoted by the predicate than the truth of (90a): in other words, for (90a) to be uttered truthfully, it suffices that Novotny has performed a single lobotomy, whereas the truth of (90b) requires that Novotny has voted for Democrats a number of times. The reasoning behind this is as follows. For human beings, evidence of their typical behaviour is supplied by actual examples of this behaviour (mostly in the past); therefore, we will take as evidence for the truth of the two propositions previous medical practice or voting behaviour of Novotny. With respect to (90a), it is part of our encyclopedic knowledge that lobotomies are shocking, difficult and dangerous operations, that they require high technical ability and a kind of moral indifference, that we do not expect them to take place very often, etc.: it follows that even a single occurrence of a lobotomy would be enough for us to consider it evidence of the Doctor's typical behaviour. As for (90b), the act described is not normally considered to be shocking or remarkable; moreover, the opportunity to vote arises quite regularly and the circumstances which affect voting behaviour may change between elections. Therefore, the speaker would not be justified in uttering (90b) if Novotny has voted for Democrats only once. On this analysis, if all the information the speaker possessed were that Novotny has voted for Democrats once, she would not have been justified in producing (90b); instead she should have uttered an episodic sentence such as (91):

(91) Doctor Novotny (has) voted for Democrats.

By contrast, the occurrence of a single lobotomy offers adequate grounds for the generalisation in (90a), and the utterance can be truthfully produced even if the single occurrence is all the speaker knows.

Two related questions arise at this point: firstly, do such inferences play any role in the on-line comprehension of generics? And if they do, how can they be accommodated

within the modified modal account I have outlined? In what follows, I will depart from previous approaches which have considered the grounds for generics as an essential part of their comprehension, and propose a more fine-grained approach. I will argue that, although they may be part of what is *recovered* during comprehension, the grounds for the truth of generics are generally not part of what is *communicated* by the speaker and therefore fall outside the scope of a pragmatic account. However, there are some cases in which the inferences warranted by different types of generalisation affect the intended cognitive effects - and hence the relevance - of the utterance; in those cases, the grounds of generics are retrieved as part of the comprehension process, and I will mention some such cases towards the end.

Consider what is communicated by each of the utterances in (89): broadly, all the generalisations convey that - other things being equal - whenever the restrictor occurs, the matrix occurs as well. (89a), for instance, roughly communicates that, according to the laws of biology, whenever something is a snake, it is a reptile. At the other end of the scale, (89e) communicates that, according to our stereotypes of Frenchmen, they eat horsemeat. One may conclude that there is no difference in the quantificational structure communicated by various generics; the difference lies in the way of verifying the statements made by the utterances in (89). In (89a), actual snakes are assumed to obey the laws of biology, and thus we would not expect to find counterexamples to the generalisation upon new encounters with snakes. (89e), on the contrary, is a generalisation about stereotypical Frenchmen, which is not particularly affected by random examples of Frenchmen who hate horsemeat. There are lots of intermediate cases: depending on the type of restrictor they admit, the utterances in (90b-d) show variable tolerance of exemplars of the subject which do not satisfy the predication. In other words: resistance to counterexamples and predictive power in generic propositions differ according to the type of domain involved. Ideal and stereotypical domains generally admit real-world exceptions more easily, whereas analytic/logical domains resist any counterexamples to the generic predication.

The verification requirements for the generalisations in (89) have consequences for the felicity of these statements given a certain amount of evidence. Generalisations of a scientific nature require a different amount and kind of evidence from generalisations concerning social stereotypes. As with the sensitivity of different domains to putative counterexamples, this kind of information forms part of our general epistemological

machinery which is responsible for inferences as to the grounds of generics whenever that is appropriate.

McCawley's examples can be explained along similar lines.[18] With these observations in mind, we can now return to our original question: to what extent does the computation of the speaker's grounds belong to the process of understanding a generalisation? One may distinguish two types of case. In the first type, judgements of truthfulness, justification and evidence are not spontaneously derived from utterances such as (90) as part of the comprehension process but are products of deliberate reasoning on the part of the hearer; as such, they have more in common with scientific concerns with verification and truth and less with the communicative intent of the speaker. For instance, if the hearer trusts the speaker to know enough about Doctor Novotny, and has no particular interest (i.e. foresees no relevance) in the retrieval of the speaker's grounds for the utterances in (90), then he will not invest any processing effort in computing the sort of evidence the speaker possesses for the generalisation. In the second type of case, the hearer may consider the recovery of the speaker's basis for producing the generalisation as a source of further (intended) cognitive effects: for instance, in (90a) the hearer may be encouraged to think that the speaker possesses some direct evidence of the Doctor's appalling medical behaviour, which will in turn increase the relevance of the utterance. In those cases, the computation of the speaker's grounds is part of the recovery of the intended cognitive effects of the utterance.

There is a parallel here to some modal statements. Consider (92):

(92) Tom must spend every weekend at work.

In most cases, the hearer can be said to have understood what the utterance communicates if he recovers a broad description of the restrictor for the modal operator ('It follows from Tom's obligations that...'). In certain contexts, however, the addressee is entitled to go beyond this bare description and recover the full array of assumptions which form the content of the restrictor (including, e.g., assumptions about Tom's professional

[18] Cf. also the grounds for the felicity of the nominalisations:

(i) John is a truck driver.

(ii) John is a whisky drinker.

environment, his relationships with his colleagues, etc.), if these assumptions satisfy his expectations of relevance.

Although I have no space for a detailed discussion here, it appears that the same line extends to another point frequently made in the literature: namely, that generics convey some reliable regularity/frequence in the occurrence of the restrictor (and, by consequence, the matrix). The stability of generalisations, the intuition that they are not 'a passing thing' (Dahl 1975: 106), they are 'homogeneous' (Link 1995), and they involve a 'probability distribution' (Schubert and Pelletier 1989: 216; cf. Kleiber 1985) can be exemplified by (91b): the utterance will not be true/felicitous if Novotny has voted only once in his life and has indeed voted for Democrats on that occasion. As before, a sufficient amount of occurrences of the activity denoted by the predicate must be available in order for the characterising proposition to be judged as well-evidenced/true: whether the hearer will attempt to flesh out what 'sufficiency of evidence' amounts to depends on optimal relevance considerations.

To summarise: uttering a generalisation invites all sorts of inferences about its appropriateness, evidential support and predictive power. However, none of these aspects of generics can be directly 'read off' from the structural/semantic representation of characterising sentences. In certain cases, inferences as to the grounds of generics do not belong to the linguistically communicated content of an utterance but are (optionally) performed by the hearer during the processing of a characterising proposition; hence they remain outside the scope of an intentional/pragmatic account of genericity. In other cases, these inferences are an essential part of computing the relevance of the utterance, and their recovery and processing is constrained by more general communicative principles.

6.3 Concluding remarks

My main concern in this chapter has been to expand on the widely acknowledged but rarely developed idea that generics are context-dependent constructions. In particular, I have tried to show that their context-dependence results from an underspecified modal underlying structure, which is pragmatically developed into a truth-evaluable representation; in the course of this development, considerations of relevance determine the set of instances/cases over which the generalisation communicated by a generic is supposed to hold. In my

discussion, I have unavoidably glossed over a number of important differences between various types of characterising sentences and ignored finer interactions between characterising sentences and kind-referring NPs; the result is a clearer, albeit less detailed, picture. Although a large number of issues remain problematic in the area of generics, it appears that a modal-based approach is a promising starting point for solving some of the puzzles.

Conclusion

The main body of this thesis was taken up by a detailed analysis of the semantics and pragmatics of a sample of the English modal verbs. I have argued for a unitary semantic treatment of *may*, *must*, *can*, *should* and *ought to*, and have given a systematic exposition of the ways in which different interpretations for these verbs arise during on-line communication. I have adopted the view that modal expressions correspond to tripartite quantificational structures which admit different contextually supplied domains of quantification; in this sense, my analysis builds on previous formal approaches which have explicitly recognised the role of contextual restrictions on quantificational domains. A crucial difference from previous accounts of modality is the proposal to treat modal verbs in their epistemic interpretations as metarepresentational operators. On this view, epistemic modals mark operations on mental representations of propositions entertained *as mental objects*, and hence reflect basic metacognitive ('theory-of-mind') abilities. Using a relevance-theoretic framework for the analysis of communication, I have shown how the ability to metarepresent, together with a variety of pragmatic considerations, can predict the range of interpretations English modal verbs receive in context.

My approach departs from previous (mainly polysemy-based analyses) on a number of further points. Firstly, I have presented some reasons for doubting that the distribution of root and epistemic interpretations is generally predictable on the basis of the configurational properties of the modals: it is preferable to view the alleged grammatical reflexes of the root-epistemic distinction as natural aspects of the interpretation process. Secondly, I have reconsidered the priority of root over epistemic meanings in language acquisition, which has long been interpreted in the psycholinguistic literature as an indication of polysemy in modal expressions: I have argued that the link between epistemic modality and metarepresentation places a threshold on the development of epistemic modal expressions (applied in conjunction with general acquisitional constraints), without threatening in any way the claim

about the unitary meaning of the modals. Thirdly, I have demonstrated that the mixed evidence for the truth-conditionality of epistemic modality falls out from the metarepresentational properties of epistemic complements and relevance considerations, and does not provide an argument for semantically separating root from epistemic modal meanings. Fourthly, I have claimed that the category of speech-act modality (accepted by some researchers as a separate type of modality) can be analysed away as a distinct sub-type of the metarepresentational use of language. Finally, I have considered the claim that root modal expressions in various languages come to express epistemic concepts at a later historical stage: consistently with my overall analysis, I have not taken this fact to indicate polysemy in modals but made some tentative suggestions of a link between subjectification in linguistic change and the development of metarepresentational readings in modals.

I started this thesis by asking: what is it about the semantic representation of lexical items that allows them to receive multiple interpretations in context? The case-study of modality has motivated two types of starting points provided by grammatical information: semantic generality (which may bring about some form of free enrichment, as in *can*, *should* and *ought to*), and semantic incompleteness (which requires pragmatically induced saturation, as in *must* and *may*). Both these types are instances of semantic underdeterminacy: the information which the modals semantically encode forms only the input to pragmatic mechanisms of utterance comprehension, which are powerful enough to yield the contextual variability of modal interpretations. Semantic underdeterminacy of this kind starkly contrasts with the semantic overdeterminacy of polysemy-based accounts of the contextual flexibility of lexical content.

Apart from the reanalysis of arguments pertaining specifically to modal phenomena, I have claimed that a range of independent factors which have been taken to support polysemy analyses (e.g. the intuitive similarity between different readings of a lexical item, the cross-linguistic translatability of contextually attested interpretations, etc.) are inconclusive. Empirical arguments aside, some versions of the theory of polysemy presuppose certain questionable assumptions about the nature and attainment of concepts: I have illustrated this point by examining some aspects of the Cognitive Linguistic theory of concepts, concerning particularly the experiential basis of cognition, mental imagery and the role of metaphor in conceptual structure. It appears, then, that polysemy is neither tightly defined nor overwhelmingly evidenced by the arguments which are commonly cited in its support; and, although there are some aspects of the phenomenon which seem to be

sufficiently circumscribed and cognitively real, their scope is more constrained than previous semantic approaches have claimed. This leaves ample space for dealing with much of the plasticity of lexically expressed information in pragmatic terms: as one might expect on an inferential account of commmunication, the concept encoded by a lexical item is simply a starting point for the construction of the contextually appropriate (:intended) construal of the concept.

This conclusion leaves open various possibilities for further research. On the empirical side, an obvious supplement to the work done in this thesis would be an extension of the proposed framework to the rest of the modal verbs (and other modal expressions) in English. In chapter 6, I touched on genericity and drew some parallels to modality; I argued that, the generic operator being essentially a modal operator, generic sentences require contextual specification of their restrictive domain in much the same way as modal expressions. I showed how a variety of interpretations (deontic, stereotypical, etc.) arises for specific generic examples, and examined ways of representing the content of the restrictor within the proposition expressed by generics. In chapter 3, I also made some observations about modal adverbs. Clearly, a more detailed investigation based on a wider array of data would be very useful.

On a different note, a number of themes have emerged in the course of the discussion in the previous chapters, which raise some interesting theoretical questions; here I will only mention four.

In the first place, I have only outlined some of the issues surrounding the mental representation of word meaning. Further research is needed to clarify the mechanisms whereby lexical concepts systematically rely on aspects of context in communication. Moreover, the territory of genuine polysemy remains to be charted with precision. For instance, it seems that polysemy appears in local alternations of the sort 'container/content' which I mentioned briefly towards the end of chapter 5: one would like to know more about the way in which these alternations work, how they relate to morphosyntactic rules (e.g. word-formation rules), and how their semi-productivity is to be represented in the grammar.

Secondly, the concept of metarepresentation seems a promising area for much interdisciplinary work. Obviously, the sort of analysis which I have proposed here for epistemicity and evidentiality can be extended to further linguistic areas. Research on theory of mind has established an exciting link between early conceptual and linguistic abilities: some recent directions within this newly-set research agenda range from the acquisition of

complementation and reference assignment to narrative and conversation (see de Villiers and Pyers 1997, de Villiers, Pyers and Broderick 1998, Astington 1990, Siegal 1996 respectively). Work in this area should allow for mutually informed judgements in linguistics and psychology (even if, as I have argued, data from development may not always directly constrain theories of semantic representation).

Thirdly, it remains to be seen how the notion of the main relevance of the utterance correlates with issues of truth-conditionality. From a relevance-theoretic perspective, the 'main point' of the utterance is naturally the locus of the cognitive effects which the utterance (intentionally) creates for the hearer, and intuitions about main relevance are expected to cross-cut (and be stronger than) intuitions about truth-conditional content. There seems to be a convergence on this point from other directions within recent relevance-theoretic research (see, e.g., Carston 1998, Ifantidou 1994, Blakemore 1990/1; cf. Sperber and Wilson 1984), so this is an issue which merits further attention.

Finally, a theme which indirectly arises from the previous pages relates to the boundaries and compatibility of formal and cognitive approaches to semantics. As I mentioned in the Introduction, one may maintain a distinction between 'real' (truth-theoretic) and linguistic (translational) semantics, and regard the two as separate enterprises with conceivably diverse domains of inquiry and methodological constraints. Still, considerations of psychological plausibility are increasingly introduced into formal semantic accounts (see Partee 1995b). In the cases of both modality and genericity, my own analysis was articulated with the purpose of providing a psychologically informed version of previous formal approaches to tripartite quantificational structures. It is a challenge for the next stages of semantic theory to combine formal elegance and psychological reality in a single research program, and develop into an integrated and cognitively robust field of linguistic inquiry.

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